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*Short Features—a few of the many in this issue. Index, pages 95 and 96.

The Farmer's Digest

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NEW IN FARMER'S DIGEST

This issue of Farmer's Digest is the first to carry a serialized article. *Judging Land,* beginning on page 88, will be continued in the November and December issues. Quite frankly, this change in our editorial policy is a trial. If you like it, we will continue to bring you selected articles or reports too long for digesting into a single issue.

In this issue, also, is our first commercial advertising (other than our book service) ever carried. Four extra pages have been printed and inserted to avoid reducing your "money's worth" of editorial material. We believe a very limited amount of selected advertising may be of service to you and provide a small additional income to help us meet continually rising costs of publication.

Our aim is to build the value of Farmer's Digest to you. We believe—and we think you agree—that you can get more really good and authentic farm information in less time from Farmer's Digest than from any other source. With your help, we can make it better still.

Coming in November

Below are a few of the carefully selected articles to appear in next month's issue of Farmer's Digest. If your subscription is expiring or if you are not now a regular subscriber, take a minute now to renew or enter your subscription. Don't miss the valuable articles below:

Cutting Costs By Feeding More Roughage
Our Farm Problems in the 50's
Artificial Breeding of Dairy Cattle
Three Ways to Dry Hay
What About Farm Land Values
Christmas Trees on Eroded Land
$1,000 An Acre Pastures
New Way to Make Grass Silage
How To Make $100 More per Cow
Can We Stop Wheat Rust
Cook Feed for Finer Finish
My Experience with Kentucky 31 Fescue
Wise Use of Fertilizer
How About Your Fire Insurance
Your Kind of Feeder Calf
Old Stuff in the Old World

The Farmers Digest

Volume 17 October 1953 Number 4

A Thousand Hogs On a Hundred Acres

The Brauers went "whole hog into hogs" and here's how it paid off. . .

Condensed from Farm Journal

Lyman Noordhoff

ONE way to learn a lot about hogs in a hurry is to raise 1,000 of 'em every year on a 100-acre farm.

That's what George and Irving Brauer are doing on their farm in Cass County, Ill. Hogs are their only source of income.

Says Jack Claar, fieldman for the local record-keeping co-op, "the Brauers make those 100 acres pay like they were a 500-acre grain farm."

When their father died and the brothers took over in 1948, they already had two strikes against them. They had been renting 90 acres to go with the 100-acre home place.

George and Irving, then in their twenties, knew that a 190-acre grain farm was too small for the two of them. Besides, the soil was light and sandy. Dairying was out, because they had no near-by market for Grade A milk.

Finally, they decided to go "whole hog on hogs." They got a hit with that decision—in fact, it has proved to be a farm management home run.

HERE'S HOW THE BRAUERS OPERATE:

- They wean 8¾ pigs per litter, and in 1950, an average year, they farrowed 123 litters. The national average is around 6 pigs weaned per litter.
- Their death loss is only 6/10ths of 1%—about a third less than the average.

Reprinted by permission from Farm Journal, Philadelphia, Pennsylvania

• They get by with 387 pounds of feed per 100 pounds of pork. Most hog men need around 450.

• Feed costs them an average of $10.49 per 100 pounds of pork—about 15% less than many efficient producers.

• Their hogs earn $178 for every $100 spent for feed—about 15% to 20% better than a good many efficient hog men.

• And with no hired help, they make at least $2 an hour raising pigs.

How do they do it? Well, Jack Claar, and others who've watched, say that their secret is *doing a lot of little things well* —things that every hog raiser *can* do.

TAKE THEIR CENTRAL FARROWING HOUSE, for instance. It's an old remodeled horse barn partitioned into 16 pens.

"You can do a lot better job with a central house, and do it easier," George contends. "You're right there during the critical period, and you can look in on the sows several times during the day between other jobs."

"You can have better pig-saving devices in a central house, it's easier to castrate there, and a lot faster to feed the sows at farrowing time."

The Brauers have never had any disease trouble in their central house, either. Ground corncob bedding keeps the oak plank floors dry during farrowing season, and the whole house is vacant and dry for four months between farrowings. Just to be sure, the boys give each pen a going over with boiling lye water before each farrowing season.

Early pigs, farrowed from February 15 to March 30, go onto rye pasture that was seeded the preceding fall. Fall pigs, farrowed August 15 to September 30, go directly onto new alfalfa-ladino seeding. During the first two weeks on pasture, each litter has an individual house. Then they go into a 10'x20' double house.

"Pasture is our high-paying crop," George will tell you. "It's worth considerably more than corn. That's why we go to a little extra trouble to get good legume stands."

"We work up a good seed bed, and put on 150 pounds of 3-12-12 before seeding oats and legumes. Another thing – we stop up every third hole in the drill, so the legume gets more sunlight."

DOES THIS EXTRA TROUBLE PAY? Well, last year the Brauers pastured an average of 85

pigs per acre on their legume pasture. That's almost three times the normal grazing capacity for hogs!

The old rye land that is used for early spring grazing does double duty. At weaning time, the pigs are moved onto legume pasture, and the rye land is plowed and planted to corn.

They use 90-day corn, so that they can get back into the field early enough in the fall to resow rye. One field planted to corn for three straight years has averaged 90 bushels per acre each year.

The spring pigs stay on pasture straight on through until they are marketed. To finish them out for the early fall market, the Brauers self-feed protein supplement and shelled corn.

UP TO WEANING TIME, the supplement includes 50% soybean meal, 25% meat scraps, and 25% wheat middlings plus minerals. They quit feeding the middlings after weaning.

"If the pigs get too big an appetite for the soybean meal," says George, "we just toss in some oats. In fact, that's the only time we feed oats. We think that good pasture or plenty of alfalfa meal gives the same benefit."

As for the fall pigs, they stay out on pasture as long as possible, and are then moved into dry lot. Here they get a supplement of 25% to 30% alfalfa meal mixed with the usual soybean meal, meat scraps, and minerals.

Sows on pasture get 2 pounds of corn per sow daily—3 pounds for gilts. In dry lot, each sow gets about 1 pound of alfalfa meal, 4 pounds of shelled corn, and 2/3 pound of supplement.

"WE THINK THESE RATIONS are the big reason why we wean nearly nine pigs per litter," George adds. "Of course, pig brooders, sloping floors, guard rails, and heat lamps all help cut our losses."

Close culling helps, too. The Brauers sell poor-producing sows and gilts pronto, and keep the good ones only as long as they continue to raise nine or ten pigs per litter. A constant check for signs of disease, and regular vaccination for cholera, round out their sanitation program.

"We sure didn't know much about it at first," George admits, "but that made us more willing to try new ideas."

* * *

The world supply of cotton for the 1952-'53 season is estimated at 48,700,000 bales. This is 1,900,000 bales above the supply of a year ago.

The Sheep of the Future

Corriedales must have something. This dual-purpose breed is fast growing in popularity. . .

Condensed from Breeder's Gazette

Samuel R. Guard

"WHAT means Corrie-dale?"

We were starting out to the hillside pasture across the creek to see his band of a hundred ewes, when he asked me that.

"Oh," I was glibly telling him, "it means the greatest sheep in this modern world, a dual-purpose sheep, a stabilized cross between the fine-wools and the long-wools, a breed first brought to this country from New Zealand by Prof. Frederick R. Marshall and Frank King 40 years ago, a sheep that marched right out from Cheyenne, Wyo., and Dubois, Ida., clear across the Great Plains and into the Cornbelt, on its merits, the sheep of the future—."

"Yes, yes," he nodded, "I read all that history a couple of years ago, but I was wondering the exact meaning of the word, Corrie-dale." Well, that set me to wondering too. I hadn't thought of it before.

"Corrie" is the word the Scotchman uses to describe a hollow in the side of a hill, or a recess at the head of the valley. "Dale," you know. It means literally a kettle of grass, a sheltered sheep pasture among the braes of Scotland or amidst the mountains of New Zealand.

Dr. Webster went out from the Scottish Border to New Zealand to practice. It was during the gold rush down under and he built up a lucrative practice. A Mr. Aiken interested the good doctor in a ranch at Otago and they went partners. As the senior member, Dr. Webster had the right to name the property, of course. And christen it he did, in 1860. Remembering the bonnie hills and vales of his boyhood he called their ranch "Corrie-dale."

Little did Dr. Webster dream

Reprinted by permission from Breeder's Gazette, Spencer, Indiana

that a hired man of his, James Little by name, would make that name Corriedale famous the world around as denoting a big, hardy, white-faced sheep that would produce a mighty good fleece and a "Canterbury lamb" at the same time.

Jamie Little went out to New Zealand too, about 1860. Sheepman that he was, he took along 9 Lincoln rams and 22 Lincoln ewes. Looking for a place to settle, he saw Dr. Webster & Aiken's ad, in a farm paper. Yes, sir, just the man they were looking for. Bring his longwools along, and welcome. So James Little became the boss shepherd at Corriedale Ranch. He found some hardy little fine-wool ewes on the place and to them he mated his Lincoln rams. Now those Merino ewes sprang directly from stock which the New Zealanders had purchased, for as much as £1000 a head for rams, if you please, in Vermont and Ohio. (So when the late J. F. Walker went to New Zealand in 1927 and brought 31 Corriedale ewes and a ram lamb back to Ohio, the circle was complete.)

Dr. Webster died. The partnership busted. The ranch was sold. And with it, James Little's Lincoln x Merinos.

But Jamie Little was not born in Scotland for nothing. He had saved a little money, and New Zealanders who counted had watched his cross-breeding —welding a fine fleece onto a big husky sheep's body! So James Little was enabled to buy a place of his own. This one at North Canterbury. He moved there and adopted Dr. Webster's name, "Corriedale Ranch."

At the new Corriedale, James Little started all over again to cross Lincolns and Merinos, then line-breed the crosses to stabilize his type. So well did he breed a Lincoln carcass under that fine-wool fleece that the Londoners flocked to Smithfield market wanting more of his "Canterbury Lamb" — a new trade name in livestock production, denoting the highest quality of carcass to be found anywhere; something we American farmers should study if we do have to merchandise our meats in order to get parity. How closely Jamie culled you may know when I tell you that from the progeny of 40,000 ewes he kept 20 ram lambs to carry on.

Well, do I remember when Prof. F. R. Marshall, then at Ohio State University, used to tell his students that the sheep of the future, the sheep for the farms and ranches of America would be neither Spanish (the Merino) nor English (the Down breeds) but maybe a cross be-

tween the two. Little did we realize that just a year or two later the Congress of the United States would commission him and Frank S. King, of the Wyoming King Bros., to go around the world to New Zealand and bring back some real dual-purpose sheep, Corriedales.

Marshall and King were back by Christmas 1914, with 65 ewes and 10 rams—Corriedales, with "U.S.A." in their ear tags. These sheep were taken to the King Ranch; that was before the U.S. Sheep Station was started at Dubois, Idaho.

So enamoured of the dual-purpose ovines was Frank King that he sold the Laramie property to his brothers, organized the Wyoming Corriedale Company and moved down to Cheyenne. He started the American Corriedale Association, he and Mrs. King did the recording.

Art King has carried the torch faithfully. His Corriedale Ranch today consists of 10,000 acres, plus the forest permit for summer range. In 1917 Frank King gave his son Art an imported ewe called "Land of Song." Thirty years later Art gave his son Jerry, just entering the University of Wyoming, an interest in the flock and together they made a clean sweep of the International wool show.

Today, not yet 40 years since the first Corriedale set golden hoof on American soil, the breed is third in number of registrations, exceeded only by the Hampshires and the Shropshires. Every year we count the recordings made by 24 flock registries for 18 breeds of sheep. Thus we have watched the steady advance of the Corriedale. Among the sheep of the world Corriedales rank next to the Merinos in number and this has been accomplished in less than a century. They must have something.

STATEMENT OF THE OWNERSHOP, MANAGEMENT, CIRCULATION, ETC., REQUIRED BY THE ACTS OF CONGRESS OF AUG. 24, 1912, AND MARCH 3, 1933, AND JULY 2, 1946, of the Farmer's Digest, published 10 issues a year at Fort Atkinson, Wis., for October 1, 1953.

State of Wisconsin
County of Jefferson SS

Before me, a Notary Public in and for the State and County aforesaid, personally appeared Hugh Highsmith, who being duly sworn according to law, deposes and says that he is the publisher of the Farmer's Digest and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management, etc., of the aforesaid publication for the date shown in the above caption, required by the Act of August 24, 1912, as amended by the Act of March 3, 1933, and July 2, 1946, embodied in section 537, Postal Laws and Regulations, to wit:

1. That the names and addresses of the publisher and digest editor are: Publisher, Hugh Highsmith, Fort Atkinson, Wis.; editor, L. Bush-Brown, Amber, Pa.
2. That the sole owner is Hugh Highsmith, Fort Atkinson, Wis.
3. That the known bondholders, mortgagees and other security holders owning or holding 1 per cent or more of total amount of bonds, mortgages or other securities are: none. Signed, Hugh Highsmith, Publisher.

Sworn to and subscribed before me this 21st day of September, 1953 (Seal). Ormal E. Kiesling, Notary Public. (My commission expires September 18, 1955.)

Agricultural Outlook for 1960

Growing U. S. Population and falling number of farmers combined with increasing national income and farm production make things look good . . .

Condensed from Michigan Farm Economics

L. L. Boger

LET'S try to figure out where prices will be by 1960. Let's see whether we can look forward to good times — when debts and expenses are easy to pay — or whether we're in for a slump where we'll have to scrape to make ends meet.

You don't have to be a mathematician to figure out that it takes less milk to pay off a $1,000 debt when milk is selling for $5 a hundred than when it's selling for $1.50 a hundred. Furthermore, you know that it's much easier to pay off the $1,000 if you think that milk prices are going to be $1.50 a hundred—and they turn out to be $5. But when the tables are turned—and you expect milk prices to be high, but they turn out to be low — the pocketbook gets pinched.

Whether to build up or reduce your dairy herd is but one of the many decisions that you must make which involves prices and prosperity six or eight years from now. Whether to produce beef or hogs, whether to buy a tractor or a cornpicker are other examples. Where prices will be by 1960 is important to you, and should be considered before such decisions are made.

Before we look at 1960, let's take a look at the past. Only a casual glance at the movement of prices in the United States since 1800 shows that they never have been stable for any great period of time.

Changing prices are the rule, not the exception. Peaks in prices have occurred after each major war, and periods of low prices and depressions have followed these peaks. Prices following World War II reached record-high levels, and are only slightly below these levels today.

Farm Price Change Greater

And farm prices change even more than the general price level. They are now below their postwar peak, but appear to have leveled off somewhat. The wide fluctua-

Reprinted from Michigan Farm Economics
Michigan State College, Lansing, Michigan

tions in farm prices have prompted some persons to remark that "success in farming depends more upon when you are born than upon how good a farmer you are." This may or may not be true, but no one can deny that prices are important in determining your ability to gain wealth over the long pull.

Our nation's population now totals over 157 million persons and has been growing at the rate of more than two million persons each year. This growth alone amounts to a city the size of Detroit. The nation's farm population, however, has been declining; it now stands at 23 million persons. But farm production has been rising. The story of agriculture has been one of fewer farmers producing more on larger farms. This is truly a healthy situation.

Our nation's income in 1952 was 290 billion dollars, as compared with 40 billion dollars in the depression years of 1932 and 1933. Industrial production in 1952 was more than twice that of the pre-war years, 1935-'39, while agricultural production was up 41 per cent.

Just because prices have fallen drastically after each major war in the past does not mean that they will fall this much again. All depressions and periods of inflation are different—so we cannot predict prices from a knowledge of history alone. Also as we look toward 1960, we'll have to admit that we can't predict such disasters as war, which might greatly affect prices.

That does not mean that we can ignore them. Certainly our outlook would be quite different if we assume that we'll soon be engaged in World War III—as compared with the assumption that the peace moves in Korea mark the beginning of a new, peaceful era in the world. It is probably realistic to assume that neither of these extremes will occur by 1960; something about half-way in between seems most likely.

In such a situation, the government will be spending fairly large sums for defense — say about 35 to 40 billion dollars a year—and carry a total federal budget of 50 to 55 billion dollars. This compares with a 1952 budget of 87 billion, of which 61 billion went for defense. Even though federal spending at these lower levels is deflationary it can be offset by an increase in private investments and spending.

Where does this put us by 1960? Let us summarize those trends and effects (Table I). In 1960, our total population will show about a 15 per cent increase, while farm population will be down 5 to 10 per cent. National income will increase substantially, and farm production could easily

TABLE I—Our Nation's Position Now and Estimates for 1960.

	NOW	1960 Estimated
Total Pop. (million).	157	179
Farm Pop. (million).	23	21
National Income (billion ...	$290	$350
Farm Production (1935-'39 — 100) ...	141	169

climb another 20 per cent. Adding all of these forces up, farm prices could well be at 310 per cent of their 1910-'14 level—or almost eight per cent above 1952 levels.

Between now and 1960 there could be a major adjustment in prices. There are several possibilities. Prices could continue to get worse; they could get worse, and then get better; they could continue to get better; or there could be other combinations that would affect decisions that you have to make.

Phenothiazine Gives Good Control of Worms In Sheep

An 11-year-old experiment at the U. S. D. A. research center at Beltsville, Md., demonstrates that mixing phenothiazine with the regular salt supply is an effective and harmless method to control internal parasites (roundworms) in sheep.

In April 1942, an experimental sheep flock was started on a program of parasite control by offering them a mixture of one part phenothiazine and nine parts salt, to be taken at will. This mixture has been available to the sheep continuously since the beginning of the program, except for an experimental interruption lasting 165 days at the start of the sixth year.

Reports show no discernible ill-effects from the drug in breeding fertility, lambing, lamb growth and survival, wool production, or general condition of the flock. Absence of death and illness caused by parasites shows good control of worms, though periodic egg-count surveys indicate that the parasites have not been entirely eradicated.

When the treatment was interrupted after five years, some losses from parasitism occurred. These losses were checked when doses of vermifuge were given and the salt-phenothiazine combination was offered again on a free-choice basis.

West Virginia University

How to Build a 600-Pound Herd

Building an average production of 373 pounds of butterfat into Illinois' top herd produced some ideas you can use. . .

Condensed from Successful Farming

Vernon Schneider

IT DOESN'T take a lifetime to build a top-notch dairy herd. Not if you use carefully selected sires, provide a year-round supply of high-quality roughages, and good herd management.

Best proof we've seen of this statement is the Clanyard dairy herd, Huntley, Illinois. It took just nine years to build this average herd into Illinois' top herd.

The 20-cow foundation herd was purchased in 1941. In 1944, first year of D.H.I.A. records, the herd produced an average of 373 pounds of butterfat and 10,385 pounds of milk. By 1950, the 28-cow herd reached 597 pounds of butterfat and 15,360 pounds of milk. And nearly all the inherited improvement in production came through the bulls rather than females.

There's nothing fancy about the Clanyard improvement program—you can put every idea to work in your herd. Program is set up on a pay-as-you-go basis. Twice-a-day milking is followed.

Then what makes this herd "tick," setting it apart from other high-producing herds?

When the original program was set up in 1941, Bill McCredie, owner of Clanyard Farms, went to C. S. Rhode, dairy specialist at University of Illinois, for help. Rhode helped pick out the original foundation cows. Good type was considered, but little attention was given to bloodlines. The cows

Reprinted by permission from Successful Farming, Des Moines, Iowa

were purchased at moderate prices. Today, several top cows in the herd are worth nearly as much as the original cost of the 20 foundation cows.

No factor contributed more to the rapid rise in production than the use of artificial breeding. Since the start, all cows have been bred artificially to top-notch bulls from the Northern Illinois Breeding Co-op. Today, the herd has several producing heifers of fourth-generation artificial breeding. In 1951, three first - lactation heifers topped the 600-pound mark.

"There's no comparison between artificial breeding and depending on one bull for herd improvement," says Manager Earle Johnson. "One bull that doesn't 'nick' with your herd can put you out of business. With the services of many top-notch bulls, your chances of getting a good mating are greatly increased. You won't have quite the uniformity, but the difference shows up in the milk pail over the long pull."

As for the rate of conception, a bull would have a hard time matching the record on the Clanyard farm. Last year, according to Herdsman Russell Mathews, 80 percent of the cattle were settled on the first service.

Russell feels two factors are responsible for the high conception rate—a close eye on the cow in heat and not breeding her back too soon. Russell watches for signs of heat twice a day. During the winter, the cows are left outside for about an hour. Any cow in heat in the morning is bred in the afternoon. Cows coming into heat in the afternoon are bred before noon the next day.

Cows are never bred back until at least 60 days after freshening. Russell likes to let two heat periods go by and catch them on the third one. This means the cow will drop a calf every 12 months. The cows are dried off two months before freshening.

All heifers are kept until freshening. Then they are culled closely. Selection is based on family type and production. About three first-calf heifers are added to the herd each year. Heifers are bred to freshen at 27 to 28 months of age.

Johnson feels the herd is now in a leveling-off period. To go much above the 600-pound figure, more emphasis will be placed on breeding, especially on close family matings of high producers.

Second big factor in getting

high production is feeding for it. The roughage program on the Clanyard Farms is second to none. This is best shown by the year-round level of production. Production in December and January is just as high as it is during the lush grass months.

The same grass-legume mixture is used for both hay and pasture. It consists of 8 pounds of domestic brome, 10 pounds of alfalfa, and ½ pound of Ladino clover. This mixture is seeded in oats in the spring. The first-year crop is used for hay to give the brome a chance to get a good start. Johnson likes to have at least a 50-50 mixture of grasses and legumes before turning the cattle in. The cattle take over the second year and stay on it just as many years as the pasture holds out.

Johnson shoots for a six-months pasture season. He can usually start pasturing the latter part of April and continue through most of September. The 20-acre pasture area is divided into three smaller plots. Each plot is pastured about 10 days to 2 weeks. Then the cows are moved to a fresh plot. After moving, the plot is clipped to give the forage a fresh start. This is especially important in maintaining the proper legume-grass balance.

Corn silage is fed the year round. During the summer, 18 pounds of corn silage is fed per head. This is boosted to 24 pounds per head during the winter months. The amount of corn silage is kept low so the cows will consume more high-quality hay and pasture. The corn is well dented before going into the silo.

The same grain ration is fed the year round. It consists of:

1,200 pounds oats
350 pounds ear corn
200 pounds linseed oil meal
200 pounds bran
150 pounds dried molasses-beet pulp
10 pounds salt
10 pounds finely ground limestone
10 pounds bonemeal

Mixed, this gives Johnson a grain mixture of about 13.1 percent protein. During the summer months, another sack of linseed meal is added to the above mixture, boosting the protein to about 15 percent. This helps keep up the butterfat test which has a tendency to slip during the early pasture season. Grain is fed at the ratio of 1 pound of grain to 4 pounds of milk up to 16 pounds of feed. From there on, the cows are on their own. And several of the Clanyard cows are producing

near the 80-pounds-a-day mark. "We're shooting for a long productive life from each cow," says Johnson, "and the surest way to burn out a cow is to feed too much grain. A mixture too high in protein only wastes protein.

A 13-percent-protein grain mixture may sound a bit low to many dairymen. However, these cows are getting their protein from another source—high-quality hay.

Every precaution is taken to assure that the winter roughage will be as high in nutrients as the summer pasture. The hay is cut at 1/10 bloom or before and immediately run through a hay crusher to insure faster drying. Johnson says crushing cuts drying time about 50 percent. The hay is in the tough stage when it is chopped and blown into the barn. Forced-air drying finishes the drying. By using this method, the leaves are saved and it still has a green color. Hay cut one day is put up the next. If the hay dries faster than it is chopped, it is baled.

The dry cows get a special grain ration consisting of a 50-50 mixture of coarsely ground oats and a 14-percent commercial fitting ration.

Good management is the third point which makes this one of the top-producing herds in the country. Herdsman Mathews watches the cows like a hawk. At the first sign of trouble, he's right on it. His aim is to prevent trouble.

Several years ago, both Bang's and mastitis were slowing down progress. Mastitis was licked by going on a strict sanitation program. This included washing the cow's udder. Teat cups are dipped between each cow, first in cold water, then with a chlorine solution. A strip cup is used to detect any sign of mastitis.

Only one milking unit is used. The 3-minute rule is followed closely. This is especially true with heifers which can be trained to the fast milking procedure. Cows are clipped and vacuumed regularly. During the winter, hoofs are trimmed to keep them standing right.

The Bang's problem was eliminated by a program of adult blood testing and calf-hood vaccination. Twice a year, blood samples are drawn and the herd tested for Bang's and tuberculosis. The calves are vaccinated for Bang's at 6 months of age, using Strain 19.

Regularity is another important management factor. Herdsman Mathews is mostly con-

cerned about doing the same job at the same time each day. Close records are kept on breeding, feeding and production.

Production records such as the ones on the Clanyard Farms don't just happen – they're thought out and planned. Then, too, it takes more than just one or two good practices to carry on a continuous program of herd improvement. You have to hit them all and hit them hard.

Outlook for Dairying Is Optimistic

The outlook for dairying is an optimistic one for the coming year, says a Michigan State College agricultural economist. Dale E. Butz predicts that dairying is likely to be favorable relative to most other enterprises.

"Support prices probably will be lowered next winter," he points out, "but this will not make too much difference in price, since increased demand due to the population increase will nearly absorb the milk equivalent of products purchased by the government this year."

Admitting that the longer-time outlook for dairying is "colored" by the introduction of filled milk products, Butz believes the change there will not be as drastic as some have predicted. He suggests that the increased fluid sales and the selling of non-fat dry milk will more than offset losses in outlets for fat. There will be a gradual shift in values placed on fat and non-fat solids with the latter taking the greater share of the milk price. This, Butz notes, will come with education and promotion as consumers realize the value of milk.

Butz looks for more emphasis to be placed on evening out the seasonal milk flow through pricing schemes and other means. Federal and state orders will be extended to nearly all fluid milk markets. Quality gradually will be raised so that nearly all milk is of bottling quality. And, Butz adds, the shift from farm-separated cream to the delivery of whole milk will continue.

"For the producer with an adequate size business, good management, good cows and proper equipment," concludes Butz, "the future is always bright. The producer with a few cows, inadequate equipment and high costs is in for a rough time."

Michigan Extension Service

HOMESTEADERS, 1953 Style

The government's Columbia River Project attracts hardy settlers. Some like the $5 an acre land, some don't. . .

Condensed from Wall Street Journal

Carter Henderson

MRS. CLYDE HENDERSON can clear rocks with anyone and she's eloquent on the subject. "It becomes a kind of game," she says. "You wonder who's going to win—you or the rocks."

"I cleared $4,000 last year on my wheat," declares 33-year-old Ted Grant, a former Chicago portrait photographer. "I'm staying. A man can breathe around here."

"I settled here to grow row crops, like beets and potatoes, but I'm raising alfalfa because that's all the shallow soil is suited for," complains 30-year-old Walter A. Peters, who hails from near Spokane, Wash.

These comments come from members of 300-odd families who are pioneering a $538 million Government homesteading experiment in this wide-open, treeless country in east-central Washington. Many live in flimsy tarpaper shacks in an area where temperatures get down to 33 degrees below zero in the long winters and soar as high as 113 above in the boiling summers.

The settlers have migrated here from all parts of the U.S., lured by cheap land and the hope of making a good living, eventually, from irrigated soil. They're participants in the so-called Columbia Basin project supervised by the U.S. Interior Department's Bureau of Reclamation. This gigantic undertaking was started back in 1933 with the beginning of construction on Grand Coulee dam, also the region's biggest source of electric power. But progress was delayed by the war. The first water was lifted over the dam just a little more than a year ago, and irrigated crops were harvested for the first time in 1952.

Reprinted by permission from Wall Street Journal, Chicago 90, Illinois.

Ultimately, a million acres of shrub - covered desert, bigger than the state of Rhode Island, will be irrigated. The present pioneers, according to Government planning, will be followed by 7,500 more families by 1960. But the rosy picture is subject to "innumerable variables," Federal reclamation men admit —including the possibility of a slash in appropriations by Congress.

As matters stand, the final plan calls for 13,000 new farms supporting 80,000 people, plus 170,000 more settlers working in service establishments and new industries, like canning plants.

Some Folk Are Skeptical

Some critics of the program already have turned skeptical eyes on what soil conservation men concede is the "largest land reclamation job ever undertaken" by Uncle Sam. In order to get rid of farm surpluses, they point out, the Government has burned potatoes, is piling surplus wheat in old warships in New York harbor, and is buying butter by the ton. Yet hereabouts, the planners propose to open up land capable of producing $100 million worth of crops annually.

Already, Moses Lake has got the feel of big things. A hamlet of 326 people in 1940, it's now a bustling, neon-lit village of 5,000.

Mayor C. M. McCosh, owner of the town's largest store—"we handle everything but footwear" settled here 15 years ago. "B'lieve I'm doin' as much business in a week," he says, "as I did in a whole year back when I first came here."

Ed Ebel, local real estate man, chimes in: "The Turf Restaurant (it includes a barber shop, pool parlor, cocktail lounge, cigar store and sporting goods shop) paid about $10,000 for its corner property in 1946. Now, J. C. Penney is laying out $30,000 for only a slightly larger piece of property." Penney will put up a department store later this year.

This village and the budding irrigation project lie in the Big Bend of the Columbia River. The life blood of the scheme is mountain snow-water, poured into concrete canals and irrigation ditches by a battery of 12 pumps at Grand Coulee dam.

According to the estimates of Phil Nadler, the Reclamation Bureau's district manager of the project, the $538 million cost is supposed to be recaptured from payments by farmers for irrigation facilities (about $85 million all told repayable within

40 years) and from a $456 million cut from Grand Coulee electricity sales expected to be repaid in full sometime after the year 2000.

Most Land Privately Owned

Most of the land in the Columbia Basin is owned by private landlords, including Northern Pacific Railroad, and these holders are offering it to settlers. The Federal Government also owns about 25% of the available acreage and sells it in farm-size units, giving preference to veterans. The state of Washington owns another 5%.

All land, public or private, must be sold at "appraised dry land prices." Some can be had for as little as $5 an acre, but to the initial cost must be added a charge of $5.50 an acre annually for water.

Veteran Ted Grant paid $17 an acre for 140 acres, and last year planted 90 acres to wheat. He figures his $4,000 profit on the basis of returns from $2 to $2.21 a bushel. He's got 40 acres of wheat in the ground this year, plus 80 acres of Red Mexican and pinto beans, and 20 acres of potatoes.

Mr. Grant spent his first year in a shack with a radio, butane stove, bed and two chairs. He'll soon have another companion: His wife. He is putting up a Quonset hut so she can rejoin him after having spent his pioneering internship with friends in another part of Washington.

Mrs. Clyde Henderson, who came here last March from Texas with her husband, says: "We hauled water from Moses Lake, 10 miles off, until August when we got our well drilled." Pleasant Mrs. Henderson, sitting on a kitchen chair in front of her tarpaper cabin, says: "We got our 60-acre farm at $5 an acre."

Some Farmers Have Gripes

Les Crawford, who moved from western Washington, finds his 80 acres "very, very productive." But Farmer Peters, the man who came from around Spokane, says: "I would have cancelled if I'd known I was going to get this marginal land." He explains: "I paid only $450 for 80 acres; it's the development work that runs into money."

Local farmers toss in additional gripes. "Water is too expensive," one of them asserts. "The guy who has to foot the bill is the poor settler; he has to pay in advance, in cash, before he gets any water. Everybody gives credit but the Government."

Another newcomer complains, "The farms are too small."

(The Government allows each settler to own no more than 80 acres of the best land, and up to 160 acres of the poorest irrigable soil.) "We're living in the dark ages. You can only make a decent profit if you farm on a large scale. I think 320 acres should be the absolute minimum."

Farmer Crawford showed a typical kind of resourcefulness. He says: "I cleared away the sagebrush by dragging a railroad tie roped to the back of a tractor around my land for three weeks."

Why did the settlers come to this hard land? Mrs. Henderson says: "In Texas, you're either awfully rich or awfully poor—and we didn't want to stay poor.

"We were leasing a sheep and goat ranch north of San Antonio, but we didn't have a chance of having our own place without going deeply into debt. We own what we've got here. When I look at our place, I don't just see this little cabin, the rough fields and our few farm tools. What I see is what it's going to look like in the future—fences up, house built, our orchard and everything green."

It Won't Happen Overnight

This probably won't happen overnight. The Bureau of Reclamation estimates it will cost an average $25,000 to level and clear a farm, put in a water distribution system, buy farm machinery, livestock, farm buildings, and put up a house. The government will accept land applications only from people with two years' farm experience and $4,500 net worth (preferably in farm tools). An additional qualification: "Proven character, industry and health."

Results from the first year's crops in the irrigated valley were totted up recently by the Reclamation men, based on a questionnaire sent out to the pioneers. The survey shows a total market value of $4.5 million, and an average per-acre yield of $171.50. The Bureau estimates, on the basis of a survey in Grant county, heart of the Basin project, that about 2% of the 1952 crops wound up in Government hands.

* * *

United States meat production will have to be 2 billion pounds greater in 1960 than in 1952 if people continue to eat the same amount each year. The single fact that the American population is still growing rapidly gives the American farmer reason for optimism.

Coming Through the Drought . . .

These Oklahoma cattlemen know it pays to practice soil conservation.

Condensed from Soil Conservation

Leon J. McDonald

LAST YEAR Oklahoma stockmen proved conservation ranching is good business.

A 5-months drought, an unusually early frost, depleted feed reserves, larger numbers of cattle on the range, and declining prices plagued stockmen. But those who had been practicing soil conservation for a number of years came through with colors flying.

Take A. P. Atkins, as an example. Atkins has practiced conservation on his 9,000-acre spread south of Hardesty in the Oklahoma Panhandle since 1941, when he signed with his Soil Conservation District.

All the rain he got in 1951 was 10.60 inches, but Atkins says: "I have been able to keep my whole cow herd, yearling heifers, and the entire 1952 calf crop without acquiring additional range or purchasing feed except the customary amount of protein supplement."

Atkins follows a flexible program. He stocks conservatively with grade Hereford cows, and carries the calves over to yearlings except in periods of extreme drought.

"The best protection against drought on my tightland range," he explains, "is a natural cover of grass which lets the soil absorb moisture whenever it falls, protects new growth, stimulates natural reseeding, and provides a reserve of feed during a long dry spell."

Atkins stocks his range with cows at about 75 percent of the estimated carrying capacity and rests each pasture one year out of five. He has fenced his pastures in such a way that they have about the same carrying capacity. He has "live" water in some of the pastures and has added nine stock ponds and four wells to provide plenty of water at convenient locations.

Reprinted from Soil Conservation, Washington, D. C.

He maintains 15 miles of fire guards.

Atkins gives his conservation program credit for increasing his calf crop 10 percent and adding 50 pounds to the weight of his calves. He has increased the carrying capacity of his ranch at least one-third with a potential gain of 25 pounds of beef per acre from cows and calves. He conservatively figured the value of his conservation ranching for 1952 alone at $50 a head on the 700 cattle he was wintering.

When the brother team of Claude and Bill Brannan started with the Love County Soil Conservation District in 1943, the native range on their 4,500-acre ranch near Marietta, Oklahoma, was in only fair condition. Now most of their native grassland is in good and excellent condition.

In carrying out their conservation program, the Brannans balanced the number of cattle with the grazing available, deferred the grazing where needed, and divided several pastures to make livestock and grazing management easier. They grew sweetclover, fescue, vetch and small grains on 400 acres of cropland for supplemental pasture and put up about 400 tons of ensilage annually. Sixteen ponds and five wells were added to provide an adequate water supply and distribute grazing uniformly.

Claude Brannan, a soil conservation district supervisor since 1948, says the carrying capacity of their grassland has increased at least 20 percent. Their calves formerly weighed 400 pounds at weaning age; now they weigh 500 pounds These two benefits add up to about a 50 percent increase in pounds of beef an acre.

For many years the Buxton Horse Shoe Ranch near Roff has been a mecca for Oklahoma's cattlemen. On this 9,000-acre ranch of native range, two blades of grass have been made to grow where one grew before.

C. C. Buxton says, "Where we were producing 5,000 bales of hay each year, we now produce about 20,000, and where we grazed off about all our grass we now leave as much as we take."

Because of the drought no native hay was cut in 1952. The ranch carries a 2-year's supply, however, so there is never a hay shortage there. As a substitute for supplemental feed last summer, the ranch turned 300 cows into a 1,500-acre pasture where it normally cuts hay. This re-

lieved pressure on the grass on the rest of the ranch.

Other good management practices here included a 17 percent reduction in cattle numbers in 1948 (which did not result in any net decrease in pounds of beef produced): deferred grazing on 3,000 acres in 1950 during the growing season; division of three pastures into six pastures to obtain more even distribution of grazing and to permit deferment for range improvement; building of 12 additional ponds; development of 12 new wells; placing salt to encourage grazing in areas of lightly - used grass; properly stocking all pastures; and production of alfalfa hay on 260 acres properly fertilized.

Buxton estimates that these coordinated conservation practices have given him an overall 15 percent increase in carrying capacity, while his range is still improving. Horse Shoe Ranch is with the Pontotoc County Soil Conservation District. It is through their districts that farmers and ranchers obtain technical help from the Soil Conservation Service in planning and applying a conservation program that fits their land.

The Percy Martin Ranch, south of Valliant, has pioneered in grassland developments in southeast Oklahoma. Of the 1,683 acres in the ranch, 480 acres are in native grass and 690 acres in tame pastures, mostly a combination of bermuda grass-white clover and tall fescue-ladino clover. Large quantities of commercial fertilizers were used to establish the tame pastures, and still are applied regularly as top dressing. The perennial bermuda grass and tall fescue overseeded with clovers give almost year-round grazing.

Management practices include proper stocking, deferment of grazing when indicated, cross-fencing, development of springs and ponds to better distribute grazing, and construction of fire guards to protect valuable grasslands.

Martin says that his calf crop has increased from 70 to 95 percent and the carrying capacity of his ranch has been upped from 15 to 20 acres per cow to 4 acres per cow. Beef production per acre has increased from 20 to 125 pounds.

Because of his perennial grasses that are ready to grow when the rains come, and good management practices through the years, Martin survived the 1952 drought in good shape. He is getting the help of the Valliant

Soil Conservation District in applying a conservation program.

Warner-Borum-Warner is a name well known among cattlemen. The 7,000-acre ranch in Muskogee County is managed by R. C. Borum, a pioneer Hereford breeder and agricultural leader. About 3,500 acres consist of native range with the bluestems, Indian grass and switchgrass predominant. Another 1,750 acres of former cropland have been set to bermuda grass overseeded with legumes. Hay is obtained from 700 acres of native meadow and a 150-acre meadow of sericea lespedeza. Alfalfa is grown on river bottom land not a part of the ranch.

Supplemental feed sources consist of 400 tons of ensilage, 100 acres of tall fescue, and occasional grazing of winter grains and vetch grown on some of the 1,000 acres of cropland.

Two tons of lime and 1,000 pounds of rock phosphate have been applied to each of the 1,750 acres of tame pastures.

Borum believes in small pastures properly stocked, and plenty of watering places conveniently located to distribute grazing evenly.

* * *

In 1939, the average factory employee worked 12 minutes to buy a quart of milk. Now he works only nine minutes.

Aureomycin Pays Off

Aureomycin, one of those new antibiotics, makes little pigs gain faster. But it's a little expensive. And you ask, how long should I feed it?

Keep aureomycin in the ration all the time until the hogs go to market, say animal husbandmen at the University of Wisconsin. Researchers report that the antibiotic will do more than make hogs gain faster. It can also cut death losses when hogs have some digestive disturbances. In their test, aureomycin helped to control bloody dysentery.

Healthy hogs didn't get much help from aureomycin after they reached 125 pounds. But the antibiotic was good insurance with all the animals because hogs with digestive disturbances made good use of it up to market time. It cost $11.54 to put a hundred pounds on a hog with aureomycin. It cost $13.74 to put the same weight on a hog without the antibiotic. The researchers conclude that continuous feeding of the antibiotic pays off.

University of Wisconsin

Open Stack Grass Silage

South Dakota Experiments show
it can mean cheaper milk production. . .

Condensed from The Dakota Farmer

SUCCULENT green grass all year around is the ideal of every dairy or cattle man. Now you can get it by self-feeding grass silage from the open stack, say Dr. Chase Wilson and Dr. Oscar Olson of South Dakota.

Silage stacked in the field has excellent nutritive value and it is cheaper to feed than hay,—no trenches to dig, no outlay of money for expensive tile or staves for silos. And whether it is put up in the silo or stacked in the field, it can be fed to dairy cows all through the winter.

Making grass silage has many advantages. Most obvious is that the weather is not so much a problem when the time comes to put it up. Rainy spells often cause great losses during the hay making season, but they are not a great detriment to silage making.

A secondary advantage is that the protein content of grass silage is greater than that of hay, and equal to that of fresh grass. Apparently, it is palatable to the cows, for they eat it willingly.

And last, but not least, the cost of feeding silage is about half that of feeding hay, even though the cows eat twice as much silage as hay.

In the experiment undertaken in South Dakota this past year, the cost of one ton of silage which had a protein content of 18% was about one-third that paid for a ton of hay containing 12% protein. This was based on community prices.

If one considers that the protein content in alfalfa silage is one-third higher than that in the alfalfa hay, the saving is still greater, since the expense for protein supplement can be reduced or even eliminated. Actually, cows at the station

Reprinted by permission from The Dakota Farmer, Fargo, North Dakota

dairy farm fed alfalfa silage without any protein supplement last year produced more milk than the year before, when they were given the supplement.

Grass silage can be put up satisfactorily in an open stack or silo. For the open stack, an area with good drainage should be chosen for the location if the cows are to self-feed from it. This will prevent mud holes and assure reasonably dry footing for the cows.

Needless to say, it is very important that the grass, legume, or grass-legume mixture is of good quality. It is advisable to use a grass-legume mixture, since cows prefer it to either grass or straight legume, and also because agronomists recommend such a combination for greater tonnage per acre.

The hay should be cut shortly after the heads are formed and have emerged from the boot of the plant, or in the case of alfalfa when it is in one-tenth bloom or earlier. At that time, the protein content is highest and also the moisture content is right for silage making. The most desirable moisture content for grass when it goes into the stack is from 60 to 70%. If above 70%, it is advisable to add some dry matter, though satisfactory silage has been made with higher moisture content and no added dry matter. It is not necessary to add preservatives to the grass to bring about fermentation.

In the experiment at the station, a windrower was used to cut and windrow the grass. Very shortly after, it was picked up by a field cutter and cut and blown into trucks for hauling. Thus it was not allowed to wilt to any extent in the field.

To establish the boundaries of the stack, a snow fence was used as a guideline. The silage cutter (with knives removed) was set by a small telephone pole which was driven into the ground close to the fence. The blower pipe and goose neck were secured to this pole which served as a rigid support. The silage was then blown from the trucks into the stack area.

Less labor is required for making an open stack than for making hay, or even for filling the silo. At the station dairy farm one man drove the truck and another man tramped and packed the stack. Packing also can be achieved by driving a tractor over the pile, but this was not done in the experiment station experiment because of the stack's location.

Much labor is saved by letting the cows self-feed from the stack. At the station two port-

able panels were constructed so that the cows could reach through to the stack. Each panel was 12 feet long, built on heavy sled-type runners so that it could be pushed forward as the cows ate into the stack.

A dry, moldy layer, ranging from about four inches on top to about 12 to 18 inches thick at the outer edge of the stack was found to be low in moisture. However, just inside this layer the moisture content increased to almost that of the freshly cut grass. The cows ate the moldy layer right along with the rest of the silage.

Results from the experiment suggest that the greater the exposure to the air, the greater is the destruction of ether extract, sometimes referred to as "fat." This is not a serious drawback, since this fraction of the silage is relatively unimportant as far as feeding value is concerned, except that it contains carotene.

Because animals can use carotent as vitamin A, it is a very important constituent in feed. Grass at an early stage of maturity furnishes this pro-vitamin. Unfortunately, carotene is not very stable, and in the presence of air, it is destroyed. In the stack made at the station dairy farm, the carotene was almost completely lost except in the center of the stack and near the bottom. When silage is stored in closed type silos (upright, trench, pit, and others) much more of the carotene is retained. At present, investigations are under way at the station to find ways to reduce the carotene loss in open stacks.

More You Fish, Bigger They Get

More fishing in most farm ponds will produce larger fish, says Dr. Henry S. Mosby. Many ponds are becoming over-crowded with the result that a lot of "nubbins" are produced, he said. Ponds, like fields, have limited capacities for production. They will produce the same poundage either in many small fish, or fewer large ones.

Farmers who prefer large fish should provide a minimum of 500 man hours of fishing per acre of water each year to keep the population thinned out. A by-product of this type of management is relaxation and enjoyment.

Virginia Polytechnic Institute

4-H Youngsters Produce Eyes to Guide the Blind

New Jersey boys and girls raise
oddest crop . . . Seeing Eye Dogs

Condensed from Report from Rutgers

BONNIE LECHER is a lively, going - on- twelve 4-H Club girl from Morris County, New Jersey, whose project is raising puppies—the Seeing Eye dogs who will some day be trained to almost incredible skill in guiding their blind masters.

Bonnie, whose pleasant and roomy home perches on a slope of Minisink Mountain overlooking the broad and lovely Berkshire Valley, is raising her tenth pup for Seeing Eye work. Her dog Kyna, an almost perfect example of the black and tan coated German Shepherd, is one of the approximately 150 that are raised each year by Jersey 4-H Club families in a unique co-operative effort that has provided 4-H youngsters with one of their most satisfying projects while at the same time solving a knotty problem for The Seeing Eye, Inc.

Seeing Eye maintains its own breeding farm at Mendham, N. J., bu the problem was to raise the dog to training age of 15 to 18 months in an environment that would make its difficult advanced education easier.

A pen or kennel-raised dog never gets exposed to the sights and sounds of a typical home—baby crying, radio and television, slamming of doors, the starting of a car, in short, the noises of everyday living. He never learns to walk on linoleum (not an easy task for a sharp-clawed dog), to mount stairs, ride in cars, be handled by different people, meet milkman and postman and thus develop affection and toleration for more than one single human.

'Bob' Porter of The State University's Extension Service, and John Humphrey, Director of Training for Seeing Eye, found the solution in 1942—the farm-raised, easy-with-animals 4-H

Reprinted from Report from Rutgers, New Brunswick, New Jersey

boys and girls whose Clubs dot every county of the state.

Six dogs were started in the first batch, 12 were placed the first year, all in Morris County, close to the Morristown headquarters of Seeing Eye. Steadily growing, especially in the more truly rural counties, the number of dogs being raised at any given time now is upward of 150.

Most Seeing Eye animals are pure-bred German Shepherds like Kyna. The breeding farm raises nothing else. Occasionally other breeds are trained—Boxers, Labrador Retrievers, and mixed breeds.

The selective breeding of the animals for temperament, stability, intelligence and the other desired factors is another job on which Rutgers has pitched in. Dr. John W. Bartlett, professor and research specialist in animal husbandry, has called upon his years of experience in genetics and animal breeding to help plan the dog breeding work. It's more than just another job to Dr. Bartlett, since he is a Seeing Eye trustee. The breeding project is also one of the largest ever undertaken in the scientific mating of dogs for predetermined factors aside from appearance.

A girl like Bonnie and a family like the Lechers are perfect for the dog-raising project. Three other children, a mongrel family puppy, farm animals and frequent callers give Bonnie's pups a wide range of experience. But more than that, the pup is part of the family circle, showered with love and affection but disciplined as a good house dog.

Another dog-raiser of entirely different background is John Roy, 19, whose family's dairy farm quite fittingly lies near Tranquility in Sussex County. He's junior leader of the 'Sussex Eyes', a 4-H group made up entirely of youngsters who take part in the dog project. He's been raising pups for nine years, now has two beautifully-matched litter mates growing up on the farm. The 'Sussex Eyes' are raising some three dozen pups.

The raising isn't done in a vacuum. County Club Agents visit the farms regularly.

The Seeing Eye's own field man, Robert S. Curtis, also visits every pup regularly, checking not only the quality of care provided and the animal's physical progress, but even more important, carrying on a continuous search for desirable traits which will contribute to greater future usefulness of a guide dog. In order to facilitate Bob Curtis' puppy observation visits,

only homes in counties readily accessible to Morristown are used, which means, unfortunately, that 4-H'ers in all counties can't participate.

The three months' training course that turns a frisky puppy into an alert and responsible guide dog is understandably an expensive one, and Seeing Eye, like every well-managed philanthropic organization, spends its funds most prudently. Every unsuitable dog that is spotted in puppyhood and ruled out before training is a substantial economy.

The information Curtis collects also plays a major part in determining the animals to be selected for breeding work, for family inheritance of good and bad traits is the basis of any scientific selection program.

Seeing Eye pays for the keep of the dogs raised by 4-H youngsters and for any veterinary care required. Health problems are not serious ones since the dogs are inocculated for contagious diseases before they go to their raiser and the care they get is of the best. Automobiles, however, even in rural areas, are the same merciless killers of potential Seeing Eye dogs as of every pup in the neighborhood.

For 4-H Club boys and girls, the projects are among "the most demanding" of any they tackle, says State Club Leader Rollyn P. Winters, and hence among the most valuable as training. Self-sacrifice in particular is a dearly-learned lesson, especially when the youngster's first dog leaves to enter training at Morristown. The broken heart usually is mended when Bob Curtis uses the pick-up trip as the delivery for a new three-month-old pup. Although the 4-H-ers never know exactly where "their" dogs go, Curtis tries to let each boy or girl know that "his" dog is now serving as eyes for a man or woman in Kentucky, California, or wherever the blind person's home may be.

An unusual assignment, the growing of 'eyes' for the blind, but a satisfying one into which the 4-H Clubbers can put at least three of their four 'Hs'—their heads, their hands and their hearts.

* * *

On test, bull calves at Utah State Agricultural College gained nearly two-thirds of a pound more daily than did heifer calves of a similar breeding and age. At the end of the feeding period, bull calves required 1.13 pounds less feed per pound of gain than the heifers.

He Hauls Pasture to His Cows

. . . Got 33 days of "grazing" last spring for 50 cows from 11 acres of rye—will this idea pay?

Condensed from Missouri Ruralist

Cordell Tindall

NEWEST IDEA in pasture management is to cut the pasture and haul it to livestock, rather than letting them graze it. One Missourian, a transplanted Britisher, is trying this new plan at Springfield with dairy cows. At first glance it would appear using a field chopper to cut feed twice a day would run into too much labor. But results already obtained by Colin Burstall would indicate it might be worth the extra effort.

The facts speak rather eloquently for themselves. Mr. Burstall started chopping an 11-acre field of rye April 1. Twice daily he cut from the swath with a field chopper enough grass for about 65 head of cows and heifers. He estimates he was feeding the equivalent of 50 mature animals—all they could eat. First cutting of rye from the 11 acres lasted until April 23.

But that's not all. There was a second cutting which produced about half as much feed as the first cutting. He started feeding from the same field on May 8 and when we visited the farm 5 days later he had chopped about half the field so it appeared he would get 5 more days.

All in all then, he got 33 days of "grazing" for 50 cows from 11 acres. This from a supplementary pasture, not a permanent pasture that would ordinarily make more regrowth.

How does this record compare to a normal grazing record for rye? A common rule of thumb is that 1 acre will graze 20 cows 1 day. Of course, the mild winter and wet spring were favorable for growth of rye in Southwest Missouri this spring.

Reprinted by permission from Missouri Ruralist, Topeka, Kansas

After the rye was chopped over the first time 10 acres of barley were handled in the same way. Next on the program was oats. For summer feed Mr. Burstall uses soybeans and Sudan grass.

All of these are supplementary pastures. Main reason is that the dry season last year was rough on permanent pastures in the area and Mr. Burstall is trying to get permanent grass back "on its feet." It probably will require longer to chop a load of grass on permanent pasture.

How much extra work is it to haul the feed to the cows? About 20 minutes are required a day to chop the grass in the field—the chopper is left standing in the field with tractor attached. Another tractor is used to haul the grass to bunks. Another 20 minutes are required twice daily to unload the grass —this could be speeded up with a mechanical unloader of some type or bunks on wheels. The farm of more than 200 acres normally has 2 tractors in operation, anyway.

Only extra expense in equipment was the purchase of a field chopper. However, many dairy farms of the same size now have field choppers as standard equipment.

Mr. Burstall also points out that pastures normally must be mowed.

Big question is whether the extra labor required is repaid with more feed to the acre. Mr. Burstall believes it is. He also points out that some time is saved in going after cows twice daily.

Another point: cows are close to the barn all the time where they can be watched more carefully. Most of the time they remain in a small feed lot, although they have access to a larger pasture.

Spot grazing is eliminated and there is no waste from cattle trampling grass or lying down on it. Everything that grows in the field is used, nothing is wasted, even weeds.

There's more work to handling the manure, but it can be hauled to the field where it is most needed.

* * *

If milk is shipped while it's still warm, it churns on the way to the dairy, so that an accurate butterfat test can't be taken. Beside lowering the butterfat test, there's more chance for harmful bacteria to develop. Cool milk quickly and keep it cool, is the advice of dairy inspectors.

MASTITIS . . .

Still Our Most Costly Dairy Disease

Here are suggestions you can use
in a well-rounded control program. . .

Condensed from The Ayrshire Digest

Wayne Pennington

MASTITIS continues to be the most prevalent and costly disease of the dairy herd.

Every farmer, large or small, who derives income from dairying can be hit hard by this disease.

While no one actually knows the total annual cost of mastitis to the dairy industry, recent estimates place the figure well over $100,000,000. And this is only the direct loss from lowered milk production!

Indirect losses from mastitis cost the dairy industry even more. Superior breeding cattle are often sold because records on a mastitis-infected animal do not reveal a true picture of her production. Costly replacements must be made. Moreover, when a high percentage of cows of milking age must be sent to slaughter each year because of mastitis, there is less opportunity to improve the herd by culling low producers.

Mastitis is widespread. In three states the percentage of cattle having some form of mastitis was reported as 20 per cent of all herds in one state; 20 to 40 per cent of all herds in the second state; and in the third state, 50 to 60 per cent of all herds!

It has been estimated that, on an average, the loss in milk production from mastitis is approximately 20 to 25 per cent of the cow's potential production. The range in loss of production, however, is well illustrated by a report from the University of Minnesota. In two pairs of identical twin cows, mastitis developed in one twin in each

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pair as a result of udder injury. Since identical twin cows should produce like amounts of milk and butterfat, it was easy to evaluate the results of udder infection.

The two cows having the disease produced from six to 54 per cent less milk and from five to 67 per cent less butterfat than their mastitis-free twins. During the first lactation period (382 days) of one pair, the infected twin produced 2,339 pounds less milk and 70 pounds less butterfat than her disease-free twin and function was lost in one quarter. In the following lactation period (237 days), she produced 2,607 pounds less milk and 96 pounds less fat than her twin. These figures amply prove the statement that a mastitis-free herd can produce the same volume of milk with one-fourth fewer cows than the average infected herd.

If a disease can be prevented by vaccination, or by ridding the premises of the source of infection, or by the feeding of a preventive drug, its control is relatively simple. No other disease, however, presents a more complex problem of control than does mastitis. Because of its very nature, mastitis has existed ever since cattle were kept for milk production, and we can never completely control all factors which contribute to this infection.

Mastitis is not a simple disease in the sense that it is caused by a single disease-producing bacteria, as is blackleg, brucellosis, or tuberculosis. Mastitis is an inflammation of the mammary gland or udder, resulting from irritation of the delicate milk-secreting cells of which it is largely composed. The term 'mastitis' means inflammation of the mammary gland.

In most cases of mastitis, the primary cause of irritation is infection of one or more quarters of the udder with disease-producing bacteria. There are about a dozen different kinds of bacteria that have been commonly found to be potential mastitis producers and more than one variety can infect a single quarter at the same time.

Mastitis - producing bacteria usually gain entrance to the quarter through the opening in the end of the teat canal. Then, if conditions are right, caused by such predisposing factors as chilling, forcing rations, bruising, improper care, they are able to multiply and produce irritant substances which damage the milk-producing cells and cause inflammation (mastitis).

In acute mastitis, the signs of this inflammation are heat, tenderness, redness and swelling. The affected cells may secrete abnormal milk, or none at all, and in time, unless the offending bacteria are destroyed, they are replaced by scars which reduce the milk secreting capacity of the gland. The degree of abnormality of the milk and the amount of tissue replacement

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symptoms of disease, may serve as a source of infection for the entire herd.

While infectious mastitis is caused by various species of bacteria, the entrance of mastitis-causing bacteria into the udder and their ability to maintain themselves are largely determined by the treatment to which

tablished and grow. Injuries of any type may make it possible for organisms already present to become active and cause an acute case of mastitis. The delicate tissue of the udder may be injured by bruising of the udder by direct blows or from rough hand milking, or may

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However, in chronic mastitis, months may pass between the onset of infection and the first noticeable signs of mastitis to be seen by the milker—the production of gargety milk.

As soon as a quarter is infected, some of the infecting bacteria are shed in the milk. These bacteria contaminate the teat cups or the hands of milkers and may be carried to other teats and other cows. Thus, an infected quarter, regardless of whether it physically shows symptoms of disease, may serve as a source of infection for the entire herd.

While infectious mastitis is caused by various species of bacteria, the entrance of mastitis-causing bacteria into the udder and their ability to maintain themselves are largely determined by the treatment to which the udder is subjected and by the general care of the herd. The bacteria which produce mastitis must be considered to be opportunists. Numerous environmental conditions, which are incapable in themselves of irritating the milk-producing cells, lower the resistance of the udder and make it more susceptible to infection. These same conditions excite mild, latent, and often unobserved infections, which may at any time progress to the stage of acute flare-ups.

What are the conditions which encourage mastitis?

Udder injuries are probably the most important factors leading to mastitis; but any abnormal condition of the udder—chilling or congestion—predisposes the quarter to infection. Deep bruises, breaks in the protective surface membranes, and sluggish circulation tend to make the gland more susceptible to infection and afford locations where bacteria can become established and grow. Injuries of any type may make it possible for organisms already present to become active and cause an acute case of mastitis. The delicate tissue of the udder may be injured by bruising of the udder by direct blows or from rough hand milking, or may

result from the use of faulty milking equipment, such as the wrong kind of suction cup, employing too high vacuum with the milking machine, leaving the teat cups on after the milk flow has ceased, or suction on udder tissue that is not prepared for quick 'let-down' of milk even at proper vacuum.

Warts, tears, and sores on teats also offer a refuge where bacteria can be harbored. Easy milkers because of large teat openings, have less resistance to infection than cows with tight teat openings.

Cold alone, unless severe enough to freeze the udder tissues, does not cause mastitis, but chilling of the udder by exposure to cold floors lowers tissue resistance and also may cause tiny openings in the skin (chapping) which serve as reservoirs for bacteria. Lowering the resistance of the animal by exposure to inclement weather, or to drafts, in turn also lowers resistance of udder tissue.

Faulty nutrition is often given as a predisposing factor. So far, no proven relationship has been shown to exist between mastitis and the ratio of concentrates to roughage or the percentage of proteins, vitamins, and minerals in the ration, although further study of some of these factors seems justified.

Overfeeding does not cause mastitis, but it does push milk production. If a cow has once been infected, heavy forced production may predispose to reinfection.

Poor sanitation obviously is a contributing cause of mastitis, since the likelihood of bacteria entering the teat is markedly less when the udder and barn are clean.

By controlling environmental factors, it is possible to prevent infection, to reduce severity of infection, and in case infection already exists, to prevent further tissue damage.

Once regarded as an incurable disease, the majority of mastitis cases can be successfully treated with the newer sulfa drugs and with the antibiotic drugs, such as aureomycin if steps are taken early.

Good management alone, good sanitation alone, and treatment alone will not prevent or control mastitis. Many farmers find it advisable to work with their local veterinarian to set up and administer an intelligent well-rounded mastitis control program.

* * *

The average American person is eating about 12 per cent more food than he did before the war.

What It Takes to Make BEEF

Suggestions for judging beef cattle in the ring and in the feedlot. . .

Condensed from The Hereford Journal

F. W. Bell

THE ANSWER to the question, "What does it take to make beef?" is "Good breeding and good feeding."

The right kind of calves are those which will make good gains whether wintered as stockers or put on full feed. Stocker yearlings will make good gains on grass and fatten readily under deferred grain feeding or under winter full-feeding practices. In other words, better beef marking requires calves of improved beef type which can make beef of good quality and do it more economically, under whatever system of beef production followed.

When it comes to the matter of beef selection, whether in the showring, with the breeding herd or on cattle markets, the object of judging is to put the best at the top. There are other ways of selecting livestock, such as bloodlines and performance records, but no other method is so generally used as judging by sight and by touch. Not only breeders but also feeders and packers rely on judging by observation to decide the value of cattle.

Certainly, judging has been tested by time for it is the means which has always been used from the beginning of livestock improvement under domestication. All of our present-day breeds resulted from selection, and the improvement within each breed has been accomplished by selection. Judging is the means used to choose herd sires, to cull herds, to buy stockers and feeders, to determine market price of live cattle, and to grade carcasses.

Perhaps we are too much in-

Reprinted by permission from The Hereford Journal, Kansas City, Missouri

clined to associate judging only with fairs and shows. Shows render a very valuable service, since they should set standards which are reliable guides to follow in improving breeding and market cattle. Of course, show stock is presented in the most attractive way possible, which means the cattle are highly fitted and expertly exhibited.

The showring renders a most valuable service in stimulating competition among purebred breeders. Only those cattle of superior inheritance can be developed into winners in showring competition. The inheritance of the characteristics necessary for better beef production is what all commercial cattlemen want in commercial cow herds and in the feedlots.

I hope it isn't confusing to think of showring judging and commercial cattle improvement at the same time. The major difference is condition, for the inheritance that guarantees good show cattle should be the same that insures more profitable commercial cattle. In fact the function of purebred cattle is to furnish the means for improving commercial cattle. Good purebred bulls are the means of grading up commercial cow herds.

Most livestock selection must be done when cattle are in their "working clothes." Culling of commercial cow herds and selecting replacement heifers is on the basis of the owner's estimate of breeding value as the cattle show in pasture condition. In fact, most of the good purebred bulls bought for commercial rangeherds are bought in breeding condition. When we judge cattle in ordinary flesh we expect to choose the kind which are most profitable for beef production. We are not selecting in high condition but we expect to choose a type or kind of cattle which respond well in the feedlot, and sell high when fattened.

From the beef producers standpoint the right kind of beef cattle are those which are most profitable to raise. Obviously, the most profitable cattle to raise are those which give the greatest average return over cost of production. They are the kind which produce beef more economically, and produce the kind of beef which sells relatively high.

The value of purebreds is in their ability to transmit their characteristics to commercial cattle. Uniformity in the calves from commercial cows is the greatest advantage to be de-

rived from the use of good purebred bulls.

Unless breeders are consistent in the standards which they follow in selection there is bound to be considerable variation within the breed. Much variation within a breed means the purebred bulls used in commercial herds will not sire uniform calves.

The function of purebred cattle is to improve the commercial stock. Purebred breeders have the responsibility of supplying breeding bulls which will sire good, uniform calves from grade cows.

Every steer and every heifer being fattened for market is an individual factory for producing beef. If any of the parts of the equipment which goes to make up this beef-making machine is below par in the strength or development necessary for converting feed into beef, then the whole factory is below par in its output.

Which brings us back to the problem of what kind or type of beef cattle we should select. To be a good judge one must know what characteristics of beef cattle are necessary to make them most profitable. The breeder who is a good judge continues to improve his herd because he knows which individuals to keep and how to mate them for further improvement.

Fundamentally, beef cattle are animal units for converting grass, roughages and concentrates into meat. In doing this they produce a highly desirable food from materials which otherwise would go to waste, so far as the needs of humans are concerned. The most profitable beef cattle are those which can do this job most efficiently, which means that the best beef cattle are those which can do this job faster.

The only way cattle can make more rapid gains is to consume more feed per day and convert more nutrients into beef. The fast-gaining steer is the one which has more room in the digestive tract to provide capacity for digesting more feed daily. Therefore, a fundamental requirement of better beef cattle is a wider, deeper body.

A second major requirement of the best kind of beef cattle is the early maturity. We may differ somewhat as to what early maturity is, and what indicates early maturity, but it means the ability to grow and fatten at the same time. Growth is a natural development of young animals, but putting on fat isn't natural until they approach or reach maturity. In

cattle that means three or four years old before they fatten most readily. But present-day systems of beef production and marketing require a type of cattle which can be fattened at any age. In other words, it must be a type which fills the demand for beef of good quality and finish from lightweight cattle. Young cattle make gains at less cost per pound than mature cattle and the early maturing type of cattle can be marketed at around 1,000 pounds weight yielding carcass beef which grades high.

This problem of early maturity certainly is a great challenge to purebred cattle breeders. Commercial beef production is very definitely on the basis of marketing lightweight cattle. The easiest way to establish early maturity is to select smaller breeding cattle, cattle whose growth period is shorter as they will fatten more readily when young. But smaller cattle are bound to be slower gainers, and that characteristic puts a penalty on producers in all phases of the business. Cowmen would have fewer pounds per calf to sell, and graziers and fatteners would have fewer pounds per head to send to market.

The beef-cattle industry and consumers want early maturity as a characteristic of improved beef cattle. Can purebred breeders supply bulls which transmit early maturity to commercial cattle without sacrificing weight for age, or finish at light weights? It is surely a highly desirable possible achievement. If breeders accomplish this it will have to be through selection for a type or kind of cattle which will fatten as they grow. To do this cattle must be equipped to convert more feed into body weight, because more nutrients are required to make both fat and growth than for growth only. This requires more capacity for feed utilization.

We must not stop here as to the importance of body room as a fundamental requirement of beef type. There are two general types of feedstuffs, namely, roughages and concentrates. Grass and roughages are the cheap feeds, and the more pounds of weight per head made from these feeds the lower the final cast of the finished animal. Of course, grain feeding is necessary during the finishing period to produce top-quality beef. But under any of the various systems of beef production, the more pounds of beef made from grass and roughages the lower the cost of the beef marketed. What kind of cattle can utilize

more roughage for producing beef? Obviously, those which have the greater body capacity which is necessary to handle more of this bulky feed per day.

We are inclined to judge body capacity from a side view, and too often we don't check closely enough from the front. But when we step around for a front view we should be selecting for another fundamental requirement of the right kind of cattle. If they are going to handle a lot of feed to make rapid gains they must have the appetite which induces them to eat more feed. They must be healthy, vigorous cattle that have constitution and ruggedness. The best guarantee of this characteristic is width and depth of chest to provide plenty of room for the lungs. Air is just as necessary as feed and water. A lot of oxygen is required in the digestion and assimilation of feed. Did you ever see good-gaining cattle which were narrow or shallow in the chest? Of course, fatter cattle are wider in front, over the top and in the hindquarters because the fleshing is thicker, but thin cattle which will get thick faster are those which have straight front legs wide apart to provide more room for the lungs.

Cattle must be wide and deep throughout to produce more and better beef. Beef is meat and meat is muscle. Good carcass beef is the thick-muscled beef. It is thick over the shoulder, over the ribs, over the loin, through the rump and in the thighs. We call this muscle natural fleshing. It is the thickness of muscle that is bred into beef cattle. It is what makes beef cattle and dairy cattle so different in general appearance. The bony framework of beef cattle and dairy cattle is about the same; the difference in appearance is due to what is over the bone, the difference in amount of muscle. Certainly cattle breeders have not reached the limit in increasing the amount of muscle in a carcass. In fact, nobody knows what that limit is.

Let us not overlook the bony framework in building better cattle. On one side of the argument commercial cowmen want bulls with plenty of bone, on the other side packers want steers with light bone. Both are using good judgment as measured by personal preference. But we cannot follow the fine-boned standard and have much of a beef-making factory. And if we say big bone is ideal the carcass will be faulty, because too big a bone means a rough,

coarse carcass. In all the aspects of what constitutes the best kind of cattle, we have to be balanced in our judgment, and good bone is an example of a characteristic which is right when it is not extreme either way. Bone does not have to be extremely large to be strong, and it doesn't have to be small to have quality. Enough bone of good quality is the appropriate answer.

The right kind of cattle must be strong cattle. They will have straight, strong legs set squarely under the body and wide enough apart to provide width at both ends. A straight back is a strong back. A wide, level rump will give more space for beef in the hindquarters, and this kind of a rump puts the hind legs where they should be for width and straightness. Shoulders should be wide but they must not be coarse and open. There should be width all through the back and hips but hips should be laid in smoothly because there is thick muscling over the loin and rump. Cattle need width at the hips but the hips don't need to be prominent and conspicuous.

What is the best type of beef cattle? I believe it is found in that kind of beef cattle which possess all the characteristics which are essential for profitable production of beef. This type cannot be expressed by saying that it is the short-legged, blocky type for this does not guarantee that all such cattle have the beef-making machinery which enables them to make more good beef in less time. The best beef cattle are those which can use grass, roughages and grain most efficiently in producing beef before reaching full growth and maturity.

Let us list the characteristics of beef cattle of this type:

1. They have great width and depth of body to provide capacity for more feed per day.

2. They are able to fatten as they grow—the early-maturing type.

3. They have the health and vigor which guarantees good appetite, and ability to digest more feed per day.

4. They have thick, natural fleshing or muscle to which fat will be added during the finishing period.

5. Their form provides a carcass with thickness of meat in all parts, with especially good development over the back and in the hindquarters.

6. They have a strong skeleton with straight lines and strong legs. Bone of good

quality and sufficient size for strength.

7. They have quality and thickness of fleshing with smoothness of covering.

The type of cattle which will meet these demands cannot lack any of the fundamental requirements for economical production of beef. This type must combine weight for age with ability to fatten properly at any age.

It must be a type which can utilize considerable grass and other roughages and be able to produce finished beef with relatively less grain charged against each hundred pounds of beef that goes over the scales.

* * *

In Minnesota, tent caterpillars were so bad last summer that sanding crews were called out where vehicles had crushed the insects and made highways too slippery to negotiate. A Soo Line freight train was halted for the same reason.

Marketing Cost Continues To Rise

Farmers are wondering why they don't get more money for their crops, and city people wonder why they have to pay so much for food. Few can realize where the dollar goes and why it is spent as it is.

Willard T. McAllister, extension marketing specialist, points out that farmers are receiving less today than they did eight years ago. Why is there a change?

This year farmers have received only 46 cents out of each dollar spent for food. The other 54 cents went to the middleman. The opposite was true eight years ago. Fifty-four cents went to the farmer and 46 cents went to middleman. Does this mean that the middleman today is making a much bigger profit than he did eight years ago? No, he isn't. Instead, the cost of marketing has gone up higher and stayed up while farm prices have declined.

McAllister makes the two following points: 1. Cost of food to consumer is affected more by marketing costs than by production costs. 2. Some farmers individually or as a group may be able to do the marketing job cheaper or better than a distant middleman. There are especially good opportunities to sell eggs, chickens, turkeys, honey, vegetables, and fruits individually, to eliminate the expense of the middleman.

Delaware Extension

125 Bushels of Wheat an Acre!

England's world-champion grower tells how he farms, what it costs, profit he makes. . .

Condensed from Kansas Farmer

KANSAS FARMERS got a kick out of swapping ideas recently with two English farmers here to study our farming conditions and practices.

One of the English farmers, J. W. Turrell, of Kings Lynn, was 1952 world-champion wheat grower with a yield of 125 bushels an acre on 9 acres. Average yield in England is 40 bushels, although 80- to 100-bushel yields are not uncommon in Mr. Turrell's area. The big yield was made with a variety of beardless winter wheat called Hybrid 46, which got its name for the year it was first introduced.

Hearing of his tremendous wheat yield, farmers in America became interested in both Hybrid 46 and Mr. Turrell's methods of farming. Could his wheat yield be duplicated in America? One big wheat farmer in Oklahoma, Robert French, decided to find out. He ordered a sample of the wheat which this year was put out on test on his farm. He then invited Mr. Turrell and his friend, a neighboring farm leader by the name of W. Burt, to spend a month on the French ranch near Boise City, Okla., for an exchange of ideas.

Under sponsorship of *Capper Publications,* the two men then were brought to Kansas, where they spent a week studying Kansas farm conditions, climate, soils, and farming practices.

While here, Mr. Turrell announced at least one test of his championship wheat was being made in Kansas. "A bushel of Hybrid 46 seed wheat was purchased this year by Herbert A. Holmes, of Winchester," he says, "and I presume he went ahead and tested the variety to see what it would do here. Hybrid 46 has a much larger and stiffer straw than anything we have seen in Kansas and a much larger berry. When we visited

Reprinted by permission from Kansas Farmer, Topeka, Kansas

the sample plot in Oklahoma in May, this English variety looked as good as it would back home at the same time of year, and was about the only wheat on the French ranch that looked like it would produce any grain. Everything else was dead or dying because of the drouth," Mr. Turrell explained.

If you looked the world over you would have difficulty finding farming conditions and practices so foreign to those of Kansas as can be found on the Turrell farm in England. His farm consists of 220 acres, of which 10 acres are in grass and the rest in crops.

All of the Turrell land is 5 feet below sea level and was actually reclaimed from the sea by the Romans 2,000 years ago. "This land has been plowed every year since and it is better now than it was when cultivation started," says Mr. Turrell.

Although rainfall in the Turrell area is only 24 inches a year, much less than in Eastern Kansas, getting rid of the rainwater is a major farming problem on the Turrell farm. "All of our land is underlaid with drainage tile," he says, "and a series of 70 small pumps in the neighborhood carry drainage water to a central pumping station that pumps it back out to sea. Pumping costs average $5 an acre a year." In addition to rainfall of 24 inches, Mr. Turrell says, heavy dews occur on at least 160 days of the year and provide possibly 8 inches of additional moisture.

These heavy dews make haying difficult and combining small grains impractical.

Soil on the Turrell farm is heavy and has a tendency to pack. After two especially wet seasons in succession Mr. Turrell found it was impossible to plow one field by ordinary means because the soil was so hard. The solution was to hire two large steam engines and to put one on each side of the field. By means of heavy steel cables a special-type plow was pulled back and forth across the field until the job was complete.

"We operate on a very tight cropping schedule," says Mr. Turrell, "and getting our land plowed on time is so important we sometimes can't wait for favorable conditions."

Credit for the record 125-bushel wheat yield, thinks Mr. Turrell, goes mostly to what he calls "a 4-course rotation of wheat - sugar beets - potatoes- and seed peas," and heavy fertilization with both barnyard manure and mixed commercial fertilizers.

No green manure is ever plowed under as the English

farmer in the Turrell area needs to raise cash crops every year. However, in addition to rotating crops, plowing depths also are altered.

"Each field is plowed 14 to 16 inches deep every year," says Mr. Turrell, "but every 5th year we plow 20 inches deep to break up the plow plan and improve drainage."

The 4-course rotation followed by Mr. Turrell requires a tremendous amount of equipment. "We need 10 times as much equipment as the Kansas farmer," says Mr. Turrell. On his 220-acre farm he maintains nine tractors and a list of his equipment includes 72 major implements or pieces of equipment, plus 4,000 potato trays and 500 tripods on which peas are dried. He also hires eight full-time hired men and special crews of extra workers during certain seasons.

Work schedules on the Turrell farm are terrific by Kansas farm standards, even under irrigated conditions here. We had Mr. Turrell run through a year's farming schedule for us and, barring some minor errors in retelling, we believe you will find it intensely interesting. Here it is as he tells it:

"The first thing we do in spring is work 10 to 20 acres of land down for oats and barley. These grains are for cattle feed and are outside the main rotation. When these are drilled it is time to work soil for peas, with seedbed preparation being similar to that for oats and barley. Peas are seeded 224 pounds an acre in 16-inch rows. After all seeding of peas is done the machinery is oiled, repaired, and stored under cover. We keep all machinery covered when not in use.

"Next we must comb our sugar beet field with heavy harrows and broadcast commercial fertilizer at rate of 1,344 lbs. an acre. Our fertilizer company (a co-operative) takes the soil samples we provide and makes up the fertilizer mixture we need.

"After fertilizer is applied we finish cultivation by going over the field five or six times with small harrows and finish up with an 18-foot roller to pack the soil to seedbed depth. Otherwise seed may be drilled too deep. Beets are drilled 15 pounds to the acre in 20-inch rows.

"By this time we need to be getting our potato land ready, which we do with heavy harrows and applying fertilizer at rate of 1,900 to 2,000 pounds an acre. We finish cultivating with drags and harrows, then plant with a planter pulled by a crawl-

type tractor, with three men on a planter.

"Peas then are ready to hoe and take both machine and hand labor to keep clean. Next to be cultivated are potatoes. We use a row-crop cultivator with hand hoeing between plants in the row.

"Sugar beets are cultivated with a beet hoe and everybody, including tractor drivers, joins in the job of hand-thinning. Beets must be hand-hoed after thinning.

"After beets are taken care of our tractor drivers go back to cultivating potatoes and hoeing peas. Sugar beets will need hoeing again when they have finished the potatoes and peas.

"About this same time we also go through the wheat, oats and barley and hand chop any weeds that exist.

"We usually start digging our early potatoes about June 15 and continue until wheat harvest about August 10 or 12. By the first week in August peas are ready to cut and are put on tripods to dry for 30 days.

"All wheat is cut with binders and shocked to be left until September. In September, when threshing starts, that wheat we plan to use for seed is immediately threshed and sent to the seed merchants for cleaning and preparing for sale. The rest of the wheat, barley, oats and peas are hauled to a stack yard and put in stacks which are thatched with wheat straw.

"Remainder of the threshing is done during winter as we need cash or straw. As soon as wheat land is clear we chisel up stubble and let it lay until October, when it is plowed under.

"Digging the main crop of potatoes begins about October 1. Potatoes are placed at harvest time in long piles on the ground and "strawed down" until marketed. Marketing is done over a 2- or 3-month period.

"Our next big job is to harvest the sugar beets and the final job of the fall is to seed our wheat for next year. We seed at rate of 2½ bushels of wheat an acre."

While yields of all crops on the Turrell farm are whopping compared to dry-land farming, costs of operation are proportionately high. Wheat normally makes 80 to 100 bushels an acre but costs about $90 an acre to produce. Oats and barley yield 100 to 120 bushels an acre with costs about the same as for wheat. Potatoes yield 14 to 16 tons an acre on the main crop and 8 tons on the early crop, with costs zooming up to $240 an acre. Sugar beets yield 14 to 16 tons and cost about $150 an acre to produce. Peas produce

10 to 12 combs (each comb is 240 pounds) an acre and cost about $90 an acre.

For all this labor and expense, Mr. Turrell comes out at the end of the year with about $8,000 to $10,000 profit before taxes. Of this amount the government takes $3,000 to $4,000. However, there are no additional real estate or personal property taxes to pay. Additional taxes are in form of "purchase taxes" and at one time ran as high as 100 per cent on such things as refrigerators and cars.

* * *

You'll be more alert, you won't tire as easily, and you'll turn out more work during the morning if you have a good breakfast.

How To Select Cedar Posts

Cedar posts have a reputation for long life and rightly so, but some cedar posts are much better than others. It is important to the fence builder to be able to choose the good posts and reject the poor ones. Cedar posts last a long time because the heartwood of this species contains aromatic oils which resist the growth of wood-destroying plants. Wood is rotted by a group of plants, known as fungi, which consume solid wood cells and destroy their strength.

As a tree grows, the center portion (in cross section) of the trunk dies, and only the outer layer continues to function in the transportation and storage of plant food. The inner, dead wood is known as the "heartwood", and the outer, living portion as the "sapwood". As the tree grows older, the heartwood section becomes wider and wider. Heartwood is much more resistant to wood rotting fungi than is the sapwood. If a tree grows slowly, the annual rings are narrow, and the wood is generally hard, consisting mostly of heartwood. On the other hand, if a tree grows rapidly, the annual rings are wide, the wood generally soft, and very little heartwood made by the time the trunk reaches post size.

Therefore, when selecting cedar fence posts for durability, examine the butt end of each post and choose those which show a high proportion of brown heartwood. Good posts are at least three-fourths heartwood. Poor posts last only five to ten years, while good ones have been known to stand in service seventy years.

Utah Extension

Market for Farm Timber

To avoid selling stumpage,
read this article. . .

Condensed from The Rural New Yorker

John F. Preston

FOR THE owner of a farm woodlot a real problem is finding a satisfactory market for low grade wood products. Sometimes there is no local market; moreover, it is easy to glut a market with these products. One answer, of course, is to grow more high-grade timber products for which there is always a demand. Farmers in general recognize this but even so, it does not help them dispose of the low grade stuff they have in their woods.

A great many farmers realize that the old way of selling all the merchantable standing timber, or all of it up to a certain diameter, is wrong. Most of them are familiar with the principles of selective cutting, and marked-tree marketing as tools for better forestry. They know that, in the long run, they lose by selling stumpage, especially at a lump sum price. They have learned (some by bitter experience) that such sales destroy the productiveness of their woods and also that harvests under such a system are a long way apart.

It is always best to sell timber from the farm woodlands on a selective cutting basis. Most loggers, however, do not care for such an operation. Their first reaction is usually in opposition to any tree-cutting system that leaves enough growing stock for a future cut. Loggers like the system where they pay a lump sum and then go in and help themselves. But why should the farmer sell his timber on terms that suit the buyer but do not permit him to

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keep his woods productive for the future?

Farmers can solve their own marketing problems if they combine forces; they own about 40 per cent of the privately owned commercial timberland in the United States. In the Northeastern States this percentage comes close to 45. When they combine their strength and use the advantages thus provided, they can better control the conditions under which their timber is sold. Meanwhile, experience shows that either consulting foresters or farm foresters, located at the state schools of forestry, can arrange sales on better terms and at better prices than many farmers are able to do alone. Until farmers learn their way about in the woods business, they can use the professional assistance of foresters.

The marketing of wood products is only one part of the wood business. The whole of it is growing, tending and selling the wood crop. Once the conception of wood as a farm crop is accepted by farmers, they learn the details of the business gradually through personal experience. When they seriously undertake the business of growing wood, they find it much to their advantage to sell processed products (saw logs, pulpwood, posts and fuel) piled at the roadside or hauled to the mill or shipping point, rather than to sell timber on the stump.

Stumpage is the equivalent of rent for the land. Sales of stumpage usually can be made only periodically and represent the accumulated rent for many years. If the stumpage buyer is permitted to cut heavily into the growing stock, he destroys for many years the ability of the woodland to produce rent. The elements that chiefly make up land rent are interest on capital, taxes and, sometimes, maintenance and depreciation on such things as fences, roads and bridges. Proper farm economy therefore is built on collecting enough rent to cover these items, plus labor and transportation, and a reasonable profit as well.

Most farm woods are small in area, from 30 to 100 acres. The annual cut from such woodlands is not very large. A small volume of timber is more easily sold in the form of cut products than as standing trees. If the farmer is his own woods operator, he soon learns to grade his product and he also comes to know which trees will make not only salable but profitable

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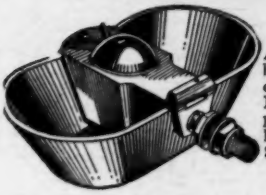

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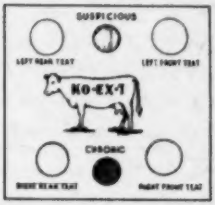

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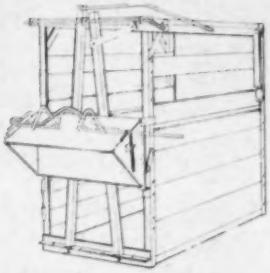

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products. He is then no longer at the mercy of the wood buyer. He is in the business of producing and selling wood products and he knows their value. When the demand and the price are right, he cuts and processes his wood products. When these factors are unfavorable, he bides his time. This last alternative is a big advantage of wood crops; they do not spoil if they are not cut every year. Within certain limitations the crop accumulates from year to year even if cutting is postponed. A wood crop thus adds stability to farm income and capital value to the farm itself.

If a farmer has a woodland, either he or the wood buyer is going to be the forest manager. If it is the latter, the income will be satisfactory to the buyer, but disappointing to the farmer. It just does not pay to take halfway measures in handling the farm woodlot, any more than it does in any other field of endeavor on the farm. You cannot expect to make money out of your woods unless you manage them properly and have the say on their disposal.

Getting a woodland on a paying basis often requires a considerable period of development in order to build up the growing stock. If the wood buyer, so to speak, has been managing it, it will contain many weed trees and culls, but few good species or well shaped trees. Yet, managed as a farm crop with annual improvement and harvest cuttings, these woodlands are capable of producing small annual incomes during the very time when the process of development is continuing.

There are several logical steps for farmers to take in improving their position as sellers of wood. The first is to get acquainted with the local markets for wood products, with the buyers of wood, and with specifications for the products. The next is to find out what products can be made from the timber in their woodlands.

Usually it is not wise to make saw logs out of trees smaller than 16 inches at breast height, even though straight, sound and clear for the length of the butt log. Logs from small trees make such poor grade lumber that it does not pay to cut them. They can be cut for pulpwood, railroad ties, poles, posts or fuel. In a well managed woods, these products will come from trees cut to improve the stand and to give the best trees room to grow. such cutting is known as improvement cutting or as thinning.

When farmers begin to think

in such terms, they are not likely to sell timber except on the basis of specified and marked trees. Some, at least, will soon sell only processed products. Soon the wood buyer ceases to have advantage over the farmer, because the latter is learning about wood values and markets.

Farmers can help themselves by dealing through the cooperatives that sell their eggs, fruit, wool and other products. Why not wood products, too? Soil conservation districts can help by getting farm foresters assigned to farmers with woods problems. They also can help by talking to the wood buyers, and by approving only those who cooperate with farmers in developing, not destroying, their woods.

By approving, I mean sending approved lists of wood buyers, logging contractors, timber agents and consulting foresters to farmers in the district; these should contain only the names of those willing to help farmers who are trying to grow wood as a farm crop.

Manure Most Valuable Farm By-Product

In Illinois alone, livestock each year produce more than 60 million tons of manure worth about 150 million dollars for its plant food value alone. That's 50 percent more than the oat crop is worth in the state and averages about $750 for each farm.

In addition to the plant food, manure contains a high percentage of organic matter which is also mighty valuable. W. N. Thompson, farm economist, says these figures actually understate the potential value of manure. If it were properly handled, at present farm prices it would be worth more than 300 million dollars, or about $1,500 a farm in added crop production.

The average ton of manure contains 10 pounds of nitrogen, 5 pounds of phosphoric acid and 10 pounds of potash—all worth at today's prices about $2.50. One cow will produce about 12 tons of manure a year.

Greatest manure loss occurs in the liquid portion. Much of this loss could be saved by proper use of bedding and handling. Thompson lists four ways to save more manure: (1) use plenty of bedding; (2) pave your feedlots; (3) haul the manure to the fields often, daily if you can; and (4) use the rotation method of feeding livestock on pasture.

University of Illinois

Now, Cover Crop for SUMMER

Tests show a plowed-under cover crop saved three times more soil in July than in December. . .

Condensed from New Jersey Farm and Garden

W. A. Mitcheltree

WOULD you believe the cover crop you had last winter, and plowed down this spring, would do you more good in July than it did last winter?

The Soil Conservation Research Station, at Marlboro, N. J., checked 197 storms over a 9½-year period that were severe enough to cause water runoff and made some astonishing discoveries. Just four of these storms (all between July and October) were responsible for 18% of the total water loss and 31% of all the soil losses for the entire period! Another 22 "goose drowners" caused 41% of water loss, 64% of soil loss—and *all these* occurred between May and November!

In general, to cause erosion like this, rain had to fall faster than two inches per hour. Not only did July have the highest amount of rainfall, but also the greatest number of high intensity storms. The most erosion occurred between May and October, with July the chief offender.

Most people use cover crops to prevent erosion during the winter months. The Marlboro experiment proved this to be a good practice. Average annual winter soil loss from bare plots averaged 1,500 pounds per acre and from cover-cropped plots, only 120 pounds. So, winter cover cropping saved about 1,400 pounds of soil a year.

But the startling part of this experiment showed up in the summer erosion pattern. How much effect would you think that plowed-down winter rye

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would have on erosion in July? Here are the figures:

Where 7,500 pounds of soil per acre per year were lost during the cultivated period from the no-cover plots, only 3,100 pounds were lost from plots that had a plowed-down cover crop! This is a saving of 4,400 pounds of soil a year during the summer, *after* the cover crop had been plowed down! To put it another way, a cover crop saved three times as much soil during the summer as during the winter.

The amount of water running off these plots give the same surprising pattern: Average winter run-off on the bare plots was 215 tons per acre. On the cover-cropped plots, only 79 tons got away . . . cover cropping saved 136 tons. During the summer, average annual loss totaled 452 tons for the non-cover-cropped plots, only 160 tons for the plowed-down areas. This put an extra 292 tons of water in reserve for the time of year crops might need it most.

A sidelight of this study indicates that the cover crop insulates the soil, thus reducing the number of times of freezing and thawing. Once the cover-cropped soil was frozen, it remained so longer than the bare soil. Cover crops act as a warehouse of readily decomposable organic matter. As organic matter breaks down in the soil it releases nitrogen, phosphorus and minor elements . . . at about the same rate the following crop can use them. Organic matter also improves the fertilizer-holding capacity of the soil.

The end product of organic decomposition is humic acid—a brownish, sticky, gelatin-like liquid. It adheres to, or coats, the soil aggregates. This "fixes" the soil and prevents rain water from dispersing it. In this way, the soil remains open and porous to water. When soil can soak up more water, there is less run-off and soil loss. Cover crop roots themselves have a gripping effect on soil particles and often hold them in place when nothing else will.

* * *

The farm value of the ingredients in a loaf of bread averaged 3 cents in 1952 compared with a postwar high of 3.5 cents in 1947. The retail price of bread, however, has increased from an annual average of 13 cents per pound in 1947 to 16.7 cents in 1952. The farmer's share of the retail price declined from 27 percent to 18 percent during this period.

Trefoil Is Different

They called it "poor man's alfalfa". Now it has proved many advantages. . .

Condensed from Better Crops With Plant Food

K. E. Varney

IN 1940 a new legume, birdsfoot trefoil, was introduced. In Vermont, five-pound lots of seed, enough for 1-acre plantings, were distributed among some 70 farmers in 14 counties. To them it was just another legume, and so they planted and managed it like red clover, alfalfa, or ladino.

A few of these seedings were successful; most were failures or, at best, near failures. The Vermont Experiment Station became interested in the plant and has done considerable work with it since. As we became more and more familiar with trefoil, one fact was soon evident—*trefoil is different.* Since alfalfa, ladino, and red clover are familiar to all, they will serve as a comparison in this discussion of differences.

Alfalfa is a deep-rooted, drouth-resistant plant and will not tolerate wet feet. Its adaptation to well-drained soils is frequently observed on a sloping site where the stand is good on the upper slopes but thins out and finally disappears in the hollows or where water accumulates.

Trefoil, Both Drouth-resistant and Water-tolerant

Ladino is a creeping plant. Its stem grows along the ground, and roots are formed all along the stem at the nodes. Thus ladino is a shallow-rooted plant. It does best on moisture-retaining soils and is very susceptible to drouth.

Trefoil is different. It has a tap root like alfalfa though not as long, and the root tends to branch out more. Unlike ladino, trefoil is very drouth-resistant, being equal or even superior to alfalfa in this respect. Unlike alfalfa, trefoil is

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very tolerant of wet feet. In fact, on heavy clay soils, localized low spots in a stand of trefoil may be covered with standing water for a month or two in late winter or early spring. These flooded areas survive nicely and at times it seems come through the winter in better condition than the rest of the field.

Trefoil Requires A Special Inoculum

Where alfalfa, wild white clover, and red clover have been grown for a great many years, soils are well populated with the bacteria, called *Rhizobia,* that are essential to the growth of these three legumes. Alfalfa *Rhizobia* are also "at home" on sweet clover and black medic, while ladino *Rhizobia* live on red, white, and crimson clover and other members of the *Trifolium* group of legumes. Although inoculation of the seed of these legumes at planting time is very desirable, failure to do so would probably not seriously affect the stand. The chances are good that most of the seedling would be inoculated by bacteria already present in the soil.

Trefoil is different. It requires a specific species of Rhizobium—one that does not occur on any of the legumes mentioned above. Since trefoil is new, our soils are completely lacking in this trefoil bacterium. Failure to provide an adequate supply of inoculum at seeding time will almost invariably result in poor, yellowish stands.

Trefoil, a Slow Starter

Alfalfa, red clover, and ladino grow rather rapidly in the seedling stage. They are thus better able to compete with oats, which are most often seeded with them, and with weeds. Successful first-year stands of these legumes are relatively easy to obtain, even under conditions of poor management.

Trefoil is different. It is a notoriously "slow starter" unless conditions are about right for it. Being a slow starter, oats and weeds will give it serious competition, unless properly managed by clipping or grazing the first year.

Trefoil, a Triple Purpose Plant

Although both alfalfa and ladino are used for hay, silage, and pasture, alfalfa is normally thought of as a hay-silage plant and ladino as primarily a silage-pasture plant. Red clover is most often considered as strictly a hay plant.

From the standpoint of yield, alfalfa is without equal. To

produce good alfalfa hay it must be harvested at the proper stage. If cut on the late side it is usually woody and is often heavily diseased with leafspot. Both these conditions drastically cut down the feeding value of alfalfa hay. As a pasture plant alfalfa must be very carefully managed since close and constant grazing will almost certainly kill it.

As a pasture or silage plant, ladino is probably without equal when properly managed. It is high-yielding, has a very rapid comeback, but cannot tolerate constant grazing. It is a poor hay plant, being succulent and difficult to cure. Furthermore, it will not tolerate the shading of tall grasses at the hay stage and it is frequently lost by letting it go to the hay stage before harvesting.

Trefoil is different. It is good for hay, silage, and pasture. It does not get woody even if cutting should be delayed until late summer or early fall. Neither does it lose its palatability when cut late, being quite different from red clover in this respect. Unlike alfalfa and red clover, it is relatively free from diseases—especially the leafspots which reduce feeding value.

As a pasture plant, Empire trefoil can stand more abuse than almost any other legume. It can tolerate close and constant grazing and still maintain a stand, although such severe overgrazing is not recommended. Being drouth-resistant it provides better grazing than ladino clover during the hot months.

Trefoil Reseeds Itself

Alfalfa seldom sets seed in this area, and so stands are maintained by plowing and reseeding. If alfalfa or red clover were permitted to reseed they would be nearly worthless for forage because they would become woody and drop most of their leaves before seed is ripe.

Trefoil is different. When grazed as a pasture plant it will flower and set seed next to the ground and around ungrazed manure spots. If managed as hay and allowed to set seed, it will do so relatively early in the season and yet retain its value for hay—neither losing its leaves nor becoming woody.

Trefoil Never Causes Bloat

One problem confronting farmers who use alfalfa and ladino for pasture, especially in wet years, is that of bloat. Care must be taken to pre-feed with dry hay or to remove livestock before they can become bloated.

Trefoil is different. At present there has never been a case of bloat that could be attributed to trefoil.

Trefoil Is Long-lived

At one time alfalfa was considered a long-lived plant, and stands were sometimes maintained from 10 to 12 years. Today, through winter injury and disease, a 6-year stand is considered a good one in Vermont. Ladino can be maintained for several years but again winter injury or poor management will probably take it out in a relatively short time.

Trefoil is different. Since it reseeds frequently and proficiently, a good established stand of trefoil can be maintained almost indefinitely. In fact, there is a native stand in Orwell, Vermont, that has persisted for 30 to 50 years in spite of the fact that the land has been abandoned for many years and is now reverting to pines and other trees.

Trefoil Can Propagate From Roots

When an alfalfa plant "heaves" as the result of alternate freezes and thaws, the root is often broken off below the crown. The plant then dies, for it cannot send up new shoots from roots. The same is true of ladino.

Trefoil is different. If a trefoil root is broken it can produce new stems from the remaining root-piece. This may, in part, help to explain the longevity of trefoil on the heavier clay soils where "heaving" is so often prevalent.

As has been pointed out, *trefoil is different* and an understanding of these differences may help to overcome some of the difficulties encountered in the past in getting and maintaining a good stand. There are four principal steps to remember when establishing trefoil, namely:

1. Adequate fertility
2. Proper inoculation
3. Early planting
4. Minimum competition.

Adequate Fertility

Unfortunately for trefoil, it was first called "poor man's alfalfa" and was credited with being adapted to soils too poor and too acid for alfalfa. It is true that trefoil will tolerate and grow on such soils but it will not thrive on them. Before planting trefoil be sure that the soil is well limed and that the fertility level is up where it should be for any self-respecting, clover-like plant.

For optimum yields of trefoil, sufficient lime should be

applied, prior to planting, to give a pH of from 6.0 to 6.8 and subsequent application made frequently enough to maintain this pH. A good rule to remember, as when growing any legume, is "adequate lime; superphosphate to get a stand; and potash to maintain a stand."

Potash is the key to higher yields, especially on the lighter soils. At time of seeding from 100-200 pounds of an 0-20-20 should be used. Following establishment, from 500 - 600 pounds per acre of an 0-20-20 or, better yet, an 0-15-30 should be used in split application, an annual fall or spring topdressing of 200-300 pounds and similar applications immediately following each cut or harvest.

On the heavier clay soils, where trefoil is particularly well adapted and where the natural potash level is quite high, greatest response has been obtained from the use of superphosphate. At time of seeding, up to 500 pounds per acre of straight super can be drilled with trefoil seed or from 100-200 pounds of an 0-20-20. Thereafter annual topdressings should be made of either superphosphate or an 0-20-20 at rates up to 400 to 600 pounds per acre. As with other legumes, a split application of this material is desirable.

Proper Inoculation

Trefoil requires its own specific bacteria, a species distinct and different from that used for any other legume. Trefoil should NEVER be planted unless it has first been treated with this inoculum. The conventional method of inoculating is to moisten the seeds, sprinkle the inoculum from the can over them, mix and let dry somewhat before planting. If this method is used, up to four times the recommended inoculum should be applied. Trefoil seed are very round and smooth and do not retain the bacteria as easily as do other seed. Then, too, the bouncing of the seed drill as it is hauled over the seedbed tends to shake off much of the inoculum.

A much more effective method is to make a thick solution of clay and water to which is added the inoculum. This is poured over the seed and thoroughly mixed. When spread out, the seed dry quickly. The clay-inoculum mix coats the seed and each seed is thus assured of carrying many bacteria.

Early Planting

Trefoil is a slow starter. Therefore, the earlier it is planted in the spring, the longer growing season it will have. The longer the growing season,

the better the chances of developing a large root system so that it can withstand the first-year hazard of winter heaving. This problem of heaving is especially severe on the heavier clay soils to which trefoil is so well adapted.

* * *

You can cut small grain losses up to 50 percent when you combine by reducing your tractor speed from second to first gear, says a University of Illinois agricultural engineer.

* * *

In many cases, planting trefoil on frozen ground in the spring has been very successful. In this case the land should be fall-fitted and the grass planted at that time or it can be seeded on frozen ground at the same time as the trefoil.

Conventional spring plantings are probably more certain than "frost plantings." A well-prepared seedbed is essential and it should be cultipacked before seeding, to provide a firm seedbed. Seed should not be planted deeper than ¼ inch. After seeding the land should be cultipacked once more.

Minimum Competition

Next to inadequate inoculation, overcrowding of trefoil has been responsible for more seeding failures than any other single factor. There are several steps that can be taken to overcome this:

1. Don't seed alfalfa, ladino, or red clover with trefoil. They are more rapid growers and so crowd it badly.

2. If you must use oats as a companion crop with trefoil, cut the planting rate down as low as possible and never over one bushel per acre.

3. Never let the oats go for grain but instead graze them off just as early as possible. They should be grazed when they are from 6 to 8 inches high. Regraze if they come back or graze and clip as often as necessary to control weeds.

4. A much more satisfactory method of reducing competition is to plant no companion (nurse) crop at all. This means a little extra work in controlling weeds but is well worth the labor.

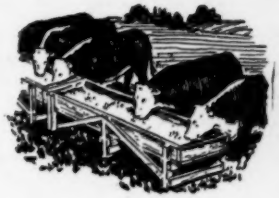
* * *

Last year, 4,295,243 dairy cows were bred artificially throughout the United States — 785,670 cows—or 22.4 per cent—more than in 1951. About 18 per cent of the nation's dairy cows are now bred artificially.

An Improved Purdue Supplement A

. . . and a New Formula for Feeding with Grass Silage

Condensed from The Farmer



A NEW, improved "Purdue Cattle Supplement A" has been released by Dr. W. M. Beeson, who originated the now-famous first Supplement A four years ago.

Alfalfa meal has been added to the new formula, replacing malt sprouts as a carrier for molasses.

In trials at Purdue university, steers fed corn cobs and the new supplement gained one-third pound more per day than did comparison animals getting the old formula and corn cobs. Average daily gain of steers receiving the modified ration was 1.6 pounds.

Cost of gain was also reduced. It took only 16 cents to put a pound of gain on steers with the modified ration, against 18 cents for the original Supplement A.

Reason for the increased efficiency is a factor, or factors, as yet unknown in the alfalfa meal which better balances the corn-cob diet.

The new formula, as modified, is as follows:

Ingredient	Lbs.
Soybean meal	650.5
Molasses	140.
Alfalfa meal (17% crude protein)	140.
Bonemeal	52.
Salt with cobalt (1 oz. per 100 lbs. salt)	17.
Vitamin A and D concentrate	0.5
	1,000.

Total ration supplies 32% crude protein.

A new cattle feeding formula —"Purdue Cattle Supplement G"—has also been announced.

This supplement, developed in part by Dr. Beeson, is designed for feeding with grass silage. It supplies the nutrients needed to winter steers on grass silage.

In trials, Supplement G has improved over-all feed efficiency of grass silage about 200%. Where 102 pounds of grass silage are normally required per pound of gain, Supplement G

Reprinted by permission from The Farmer, St. Paul, Minnesota

cuts silage consumption to 31 pounds for the same gain.

Daily gain of steers was also increased. On 20 steers tested, average daily gains increased by one-third—to about 1.09 pounds per day—on a ration of 33 pounds of grass silage and 1.25 pounds of Supplement G per steer per day.

Ingredients of Supplement G are:

Ingredient	Lbs.
Alfalfa meal (17% dehydrated)	400
Molasses	329
Dried Brewers' grains	132
Bonemeal	105
Sale and cobalt	34
	1,000

Ration Supplies 12% Protein

In still another experiment Beeson showed steers could be fattened to "choice" grade on either grass silage and limited corn, or corn silage and Supplement A. A ration of 50 pounds of grass silage and seven pounds of corn daily, with or without supplement, gave "efficient and rapid" gains.

* * *

Printed lettering will come off feed bags if you pour kerosene on the letters and roll the bags up for a day or two.

* * *

Did you know that the average hog which goes to market yields around 35 pounds of lard? From 14 to 15 percent of the live weight of the average hog represents lard.

Scientists Get Tender Beef From Tough Bulls

Scientists are developing a new method for turning tough meat from beef bulls into tasty, tender roasts and steaks. A compound known as diethylstilbestrol, a synthetic hormone, may provide the answer.

The work is an outgrowth of a project at the Ohio Agricultural Experiment Station to improve the rate and efficiency of gain of fattening calves. Previous experiments showed that bull calves gained faster than steers but bull carcasses were less tender and lacked the finish desired by consumers.

"We implanted sex hormone pellets under the skin of the bull's head," said Earle W. Klosterman, project leader at the Ohio station. "These animals gained faster, ate less feed per pound of gain and produced meat of highly acceptable quality."

Although tests show a negligible amount of the chemical remains in the carcass, the Pure Food and Drug Administration at present has approved use of diethylstilbestrol for poultry only. For this reason, Klosterman cannot recommend the practice for general use until approval is granted. *Ohio Extension Service*

Milk Parlor Works Miracle

. . . saves half of labor and produces higher quality milk from this 120 cow herd. . .

Condensed from The Southern Planter

Lemuel Sutphin, Jr.

THE milking parlor and loafing shed of J. W. Eustace of Catlett, in Fauquier County, is one of the most efficient dairy set-ups in Northern Virginia.

Equipped with six milking units, pipelines and cold wall tank, this farm is a practical example of modern dairying with 120 cows. The milking period does not exceed two hours.

With every condition at its best, two men, each operating three milking units, can turn out one-cow-a-minute. It is done on Sundays with a limited force. However, during the week a third man "stands by," assisting in feeding grain in the parlor and opening the doors.

Seven Men Handle 1,000 Acres

The whole grassland farming operation, consisting of 1,000 acres, is taken care of by seven regular men, in addition to Eustace himself. Only three of the men work in the dairy, with the exception of bedding the loafing shed. One man does the cleaning of the parlor and washing dairy utensils, finishing by 12 o'clock noon, making him available for other jobs, such as grinding feed in winter and farm jobs in the summer. The other two men, the one who operates the other three units and the "stand-by" man, do the outside feeding and management of the cows. They are then ready for farm work.

Mr. Eustace states that one man working four hours a day could do the feeding and bedding. He does not operate on this basis, but lets the farm workers help with the bedding job in order to get the job done quickly and before the cows start lying down in manure. If one man did the job alone additional currying and cleaning of the cows would be necessary.

Reprinted by permission from The Southern Planter, Richmond, Virginia

Compare the efficiency of the present set-up with the former operation, which consisted of a stanchion type barn. The old system was operated with four milking units and took three men to milk 60 cows in two hours. Two of the men did the milking and one carried the milk. Cleaning and washing up the 60-cow stanchion barn required three men working until noon each day.

Therefore, the present operation saves three full-time men which would be necessary if the 120 cows were milked in stanchion type barns.

The present installation consisting of loafing sheds, milking parlor, 600 gallon cold wall tank and other equipment cost approximately $22,000. The whole cost to build stanchion barns, milk house, equipment, etc., at present prices would cost approximately $500 per stall or $60,000.

The present layout has resulted in higher quality milk. Mr. Eustace has been on Honor Roll on the Washington milk market every month since the operation started. To be on Honor Roll bacteria count must be 5,000 or less per month. His bacteria count has been as follows:

December, 1952 2,600
January, 1953 3,900
February, 1953 3,300
March, 1953 4,200
April, 1953 3,500

In the old stanchion type operation, his average bacteria count ran about 20,000. Also, in the old set-up Eustace estimates that five gallons of milk per day was wasted on the farm in addition to the amount lost at the dairy plant. This is estimated at a pound per can each day.

In the beginning of the operation, naturally, the cows would not voluntarily walk up the lanes to the parlor. The cows had to be trained. Also, the cows have been trained to eat all their grain in the milking parlor during milking. It took about two weeks to get the cows to eat all their grain. The highest producing cows eat 14 pounds of grain per day.

In order to get the cows to go through the parlor during the summer while on pasture it necessitated a change in grazing practices. The cows are turned out on lush pastures at 8:00 a.m. and brought back to the loafing shed between 11:00 a.m. and noon. The cows fill up quickly on high quality improved pasture and are then ready to ruminate. Mr. Eustace lets the cows do this in the loafing shed. There has been no difference in milk production by this system.

However, Mr. Eustace states that the pastures must be "tops."

Another advantage in this system is that taking the cows off pasture hours before milking eliminates bad odor and grass flavors in milk. Grass silage at 30 pounds per day is fed during the summer months. This is fed after milking.

Since beginning the present operation Mr. Eustace has found that feeding of hay and silage in racks with the cows standing on the manure pack in the loafing area is not satisfactory. He is going to construct an outside open shed to the side of his loafing shed with cement flooring 40 feet wide with feed racks down the middle to eliminate this unsatisfactory condition.

Grain is fed during the summer, while cows are on pasture and getting some grass silage, at the rate of one pound to six pounds of milk.

Horse flies cause a considerable drop in milk production in this area during June, July and August. With his present grazing practices of bringing the cows in during the middle of the day, Mr. Eustace hopes to eliminate this problem to some extent and plans to put a fan in the loafing shed to create a breeze which the pests do not like. This should also make the cows more comfortable.

It takes three times more bedding for a loafing shed than the stanchion type barn. But this increased cost of operation is probably off-set by the increased tonnage of manure.

The loafing sheds on this farm have been constructed without poles in the center. This shed is bedded once a day and cleaned out once a year. Cleaning out the shed this spring was done by pushing the manure outside with a bulldozer, requiring only two hours. It then took two farm men only three weeks to spread it on the fields.

Mr. Eustace says that the milking parlor-loafing shed operator must be more efficient in all phases of the operation. He must have excellent pastures, must train the cows properly, and, above all, must hire men of high quality and ability. The job itself requires less manual labor, but more brain power.

The use of the strip cup is absolutely essential in the pipeline system to detect bloody and lumpy milk before it goes into the tank. This, he believes, along with rapid cooling accounts for lower bacteria count, and higher quality milk for the consumer..

This procedure also is beneficial in detecting udder trouble

which may affect the health of the cow. His cows stay in better condition, seldom go off feed, require less currying and brushing and, therefore, are easier to handle.

Degree of Finish Key to Future In Swine Business

As hog prices continue to show strength, reflecting the cut-back in production and marketing after two years of below average returns, farmers may well prepare for future changes in marketings and prices.

As is usually the case, says M. Paul Mitchell, Purdue economist, the present favorable price relationships between hogs and corn will bring forth some expanded production and marketings, along with some price set-backs. He believes farmers can prepare for this adjustment by paying more attention to the type and finish of hogs marketed.

He points out that less than a year ago the U.S.D.A. established definite grades for butcher hogs. Admittedly, the description of these five grades—choice no. 1, choice no. 2, choice no. 3, medium and cull—is somewhat vague today for the average hog raiser, and Mitchell adds that they probably cannot be fully understood until the live hogs are slaughtered and the resulting carcasses studied.

However, farmers will be safe in concentrating on the choice no. 1 or meat type hog which so well fits the specialized eastern slaughter trade. This grade calls for a smooth, deep-sided hog carrying a little more length than the average market hog and marketed before excessive finish or lard detracts from his value.

The specialist indicates that hog producers will have to gain by experience and observation the skill that enables them to market hogs with ideal finish. Specifically, this calls for a back fat thickness of 1.25 to 1.50 inches. Hogs of the right type, he says regardless of breed characteristics, normally reach this degree of finish at weights ranging from 180 to 230 pounds.

Avoiding excessive lard production is the most important consideration under the revised U.S.D.A. grades, believes Mitchell. In periods of favorable hog-corn ratios, as at present, the average farmer is interested in converting as much corn as possible into pork. Often he loses sight of the fact that most of the weight put on hogs near the end of the feeding period is lard, a product which currently is valued at about one-third the price of live hogs.

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One Man, One Feeder and 17,000 Broilers

Condensed from American Poultry Journal

John C. Brown

MARSHALL DAVIS has one of the largest broiler houses in the Gonzales area of Texas. But with the aid of mechanical equipment, especially his feeder, it takes only one man to operate it. The size of Davis' house is 48x350 ft. In it he grows 17,000 broilers.

The house is a semi-monitor type, of frame construction, with wood siding and an aluminum metal roof. It has a dirt floor. Ventilation is no problem. Adjustable openings both on top and bottom of the front and back of the house, plus the adjustable opening in the roof provide all the ventilation needed. In summer, large doors at both ends of the house can be opened for additional ventilation. All these openings plus the aluminum roofing maintain a temperature in summer 15 to 20 degrees cooler inside the house than outside. Even on the hottest days, the birds are never in distress because of heat.

Davis started growing broilers eight years ago in twelve 14x40 ft. houses each holding 1,000 birds. He is still growing broilers in these houses. Like a lot of other growers, Davis had his share of troubles and ups and downs his first couple of years in the broiler business. A respiratory ailment hit a couple of his broods. "We literally carted dead birds to the city dumps by the truck load. At least, at the time, it seemed that way to us. But now, due to various vaccines which we use for the prevention of those diseases, we have very little trouble," relates Davis. He vaccinates all his chicks at day old with an intranasal live virus Newcastle vaccine. Worming the birds twice during the growing stage and cleaning out all litter after each brood has been marketed is another one of his practices.

He finds that 17,000 birds under one roof are a lot easier to tend to than are 12,000 broilers

Reprinted by permission from American Poultry Journal, Chicago, Illinois

scattered about in 12 different houses. He attributes most of the credit for the time and labor that he saves in his large house to his feeding equipment. In the 14x40 ft. houses, he has to hand-fill every single feeder, of which there are several in each house, which is time consuming and back breaking. In his 48x350 ft. house, he merely fills the huge hopper on his one automatic feeder, a chore which requires about a half hour's work a day.

His automatic feeder is located in the center of the house. It has eight lines of feeder troughs coming off it, four lines servicing each end of the house. The feeder pulls 1,560 ft. of chain along these troughs. It is timed to operate at intervals throughout the day and night. Feed conversion has been good, and feed wastage has yet to occur with the feeder.

Watering is done with automatic watering troughs, the water for which is supplied from two deep wells. Brooding is done with gas brooders.

All night lights are used so the birds may eat during the cooler part of the hot Texas days.

Grit is fed the birds throughout their growing period.

Only birds of the same age are ever kept on the farm. They are usually marketed when they are 11 weeks of age, at which time they average slightly over 3 lbs.

Wildlife Vulnerable To Chemical Sprays

Improperly used herbicides and insecticides can have lethal effects on fish, birds, and other forms of wildlife.

Game birds may be killed by direct contact with some poisons, or may die after eating insects contaminated with the toxic materials. Careless spraying near water areas can be fatal to both birds and fish.

Use these precautions: Spray on a windless day to avoid contamination of additional areas by wind draft; cut off the spray when passing over sloughs and marshes; do not refill equipment with water by dunking it in streams—poisons remaining on the equipment can kill fish for miles downstream; do not spray when rain is expected—chemicals not only will be wasted but they will wash into streams; and be extremely careful to spray only the desired areas.

V. P. I.

Brahman Influence on Beef and Dairy Cattle Breeding

Cross breeding tests in Louisiana show value of Brahman Blood in beef herds of the south and promise success with dairy cattle. . .

Condensed from The Cattleman

Roger B. Letz

ALTHOUGH Brahman cattle are relatively new when compared with other breeds of cattle in the United States, their influence on the beef cattle industry is significant and is particularly noticeable in the Gulf Coast area of this country.

Only a few hundred Brahman cattle have been imported into the United States, the majority of which were brought to this country within the past fifty years. From this beginning the breed has grown rapidly to a position of importance among beef breeds and Brahman cattle numbers are now at an all-time high. More than 200,000 cattle have been registered by the American Brahman Breeders Association and the Pan American Zebu Association, and it is estimated that there are now more than 10,000 owners of Brahmans in the United States.

The acceptance of the Brahman has been nation-wide and the breed is now found in every state in the union, with the possible exception of two New England states. The largest concentration of the breed is in the South along the Gulf Coast, where they have demonstrated their ability to thrive in a humid climate.

The largest number of registered Brahman cattle are in the states of Texas, Florida, Louisiana, Georgia, Mississippi and Alabama.

American breeders have worked wonders with improving the meat producing qualities of the breed. They have

Reprinted by permission from The Cattleman, Fort Worth, Texas

added pounds of high quality meat by following programs of selection and have utilized the small amount of purebred Brahman blood imported into the country to its best advantage.

The Brahman has many qualities desirable for the production of beef. Many purebred herds have been developed and these breeders have made excellent breeding bulls available to commercial cattlemen.

The great impact of the Brahman on the beef cattle industry in the Gulf Coast country has been the infusion of Brahman blood into the many thousands of commercial herds, which have utilized this blood to a profitable advantage.

Brahman blood has been used extensively for cross breeding purposes. The cross of Brahman blood with that of the British breeds has become very popular during the past few years. The hybrid vigor obtained in crossing two different species has been most desirable in many cases and cross breeding using Brahman blood is a very widespread practice among commercial cattlemen in the southern states. Many different combinations of cross breeding have been tried and in some cases new breeds have evolved from these crosses. Some of the cattle that have been developed from the use of Brahmans in combination with other breeds are the Santa Gertrudis, Brangus, Beefmasters, Charbray, Braford, Angford, Indu-Angus, and others.

The use of Brahman blood has been more pronounced, however, in different percentages and combinations in the commercial herds of grade cattle along the southern coast. There are many commercial herds of grade cattle in the coastal regions that contain a portion of Brahman blood.

There has been much discussion among commercial cattlemen concerning the most desirable amount of Brahman blood to be used in their herds and the percentages now used range from purebred down to a trace. Scientists have been working on this problem and a great deal of research has been devoted to trying to find the kind of cattle that will produce the most beef for the most profit in the humid areas of the country.

The Iberia Livestock Experiment Station located near Jeanerette in the southern part of Louisiana has conducted experiments since 1914 for the United States Department of Agriculture in an effort to develop types of livestock that would be adaptable to the climatic conditions of the Gulf Coast area.

In 1916 a cross breeding program was begun using native Louisiana cows and grade Hereford cows from Texas ranges in crosses with purebred Brahman, Hereford and Shorthorn bulls. This first experiment was set up to determine the best breeding program for commercial beef production under Gulf Coast conditions. Many combinations were tried and after a few years it became evident that a percentage of Brahman blood was desirable under these conditions because the Brahman has the ability to thrive under adverse conditions of heat, insects and disease. The current beef cattle program was begun in 1932 using purebred Aberdeen-Angus cows and bulls and purebred Brahman bulls. Africander bulls are also being used in a cross breeding program with Aberdeen-Angus. In 1939 several purebred Brahman cows were added to the herd to permit reciprocal crossing. The station now has a purebred herd of Brahman cattle which are used to supply Brahmans for the cross breeding program.

In general, results from experiments at the station indicate that less than one-half but at least one-fourth Brahman blood is desirable in the Brahman-Angus cross. Opinions of commercial cattlemen in the coastal area differ greatly as to the blood percentage that will produce the best results. Some prefer half - blood cows and others smaller or greater amounts of Brahman blood. Nevertheless, it is a widely accepted fact that the Brahman influence in the commercial herd is of sound economic importance.

Many experiments have been conducted to determine the heat tolerance of beef animals at the station. In these tests, the Brahman suffered the least from the heat and had the ability to transmit this desirable characteristic on to the cross bred cattle.

The cross between Brahman and Aberdeen-Angus is generally black in color. The polled characteristic is more pronounced in the crossbreds that carry less Brahman blood. Cows of this cross are good milkers and are usually productive at an advanced age. Their hair is generally black with the glossy, shiny appearance typical of Brahmans. The Africander-Angus cross may be either red or black in color. Results at the station indicate that the Africander-Angus cross is not as sound economically for the coastal country as is the Brahman-Angus cross.

Another phase of work at the

Iberia station which involves the use of Brahman cattle is the dairy breeding program, under the supervision of Dr. S. L. Cathcart of the U.S. Bureau of Dairy Industry.

In 1946 the station obtained two Red Sindhi bulls and two heifers for the purpose of conducting experiments of cross breeding these cattle with animals of the principal dairy breeds. The purpose of the project was to see if the milk production of dairy cattle in the coastal area of the country could be increased and to determine if better dairy cattle could be developed for the South.

The Red Sindhi is a strain of Brahman cattle which has been bred and used for milk production in India for many hundreds of years. They are smaller in size than the beef strains of the breed and give more milk.

All of the crossing breeding at the Iberia station in the dairy division has been done with the Red Sindhi and Jersey breeds. Sindhi bulls were mated to Jersey cows to produce halfbred animals. Some of the halfbred females were mated to Sindhi bulls and some to Jersey bulls. The resulting offspring of the Sindhi bulls were three-fourth Sindhi and one-fourth Jersey and the offspring of the Jersey bulls were three-fourths Jersey and one-fourth Sindhi. The purebred Sindhi heifers have been mated to Sindhi bulls exclusively in an effort to increase the number of purebred Sindhi Brahmans. There are only a few of these in the country, the Iberia station having the largest number.

The station now has a substantial herd of halfbred Sindhi-Jersey cows that are being studied from the standpoint of growth rate, milk and butterfat production and heat tolerance. Some excellent results have been obtained from half blood cows but according to station personnel it is too early to tell what the most satisfactory combination of the Sindhi-Brahman blood will be.

Results so far indicate that Brahman blood will play an important part in producing a dairy cow that will do well under climatic conditions along the Gulf Coast. It now seems reasonable to expect that the qualities of the Brahman that have been used so successfully in combination with other breeds in beef cattle production in the southern commercial beef herds will also play an important part in developing a better dairy cow in the same area.

WATER Must Be Abundant

1/500th of an acre on a scale weighs the dew and uncovers important facts about water usage by crops. . .

Condensed from Ohio Farm and Home Research

L. L. Harrold and R. E. Yoder

HOW IMPORTANT is water to my corn crop? Or to my hay crop—or to my pasture?

Farmers don't have to be told the answers. They know that water is needed, but how much? How often? Will it affect the yield? These are questions yet unanswered.

Crop use of soil water has been studied for a number of years at a project jointly carried on by the U.S. Soil Conservation Service and The Ohio Agricultural Experiment Station near Coshocton, Ohio. Here one of the water problems under investigation is soil-water supplies and crop use.

The experimental equipment built in 1939 is comprised of a natural block of soil 8 feet deep and 1/500 acre in area placed on scales beneath the ground. This soil block is called a "LYSIMETER". There are very few of such weighing monolith lysimeters in the world.

It is the purpose of this phase of the overall project to determine what portion of the precipitation is lost in runoff and how much of that portion of precipitation which is absorbed by the soil drains to soil depths below the root zone and how much is returned to the atmosphere by evaporation and transpiration (crop usage) processes. As the cropping program of the land surface of these lysimeters is made up of a four-year rotation, corn, wheat, and two years of meadow, it was possible to derive water and plant data for different crops.

In the growing season, May to September of three corn years, from 18 to 24 inches of water was consumed each season in producing crops, ranging from 60 to 140 bushels per acre.

Reprinted from Ohio Farm and Home Research, Wooster, Ohio

For the greatest yield of 140 bushels of corn, water used averaged 23 inches. This is one acre-inch of water for every six bushels of corn. For every pound of grain and stalk, nearly 400 pounds of soil water was used up. In considering the grain alone, about 72 gallons of water were used for every pound of corn. In some years a 1-pound ear of corn with its stalk consumes about 100 gallons of water.

Although the above figures of seasonal water demand are important, there is something even more valuable, that is, the variations in water needs throughout the season. When the 5-month water use value for 140 bushels of corn totaled 24.6 inches, the monthly values ranged from a low of 2 inches to a high of over 8 inches.

The average daily use of water for corn in July was 0.28 inch per day—two inches of water being consumed in about a week. Records show, however, that for critical periods during July and August, 2 inches of water was consumed in 6 days. Water usage for cornland in May and early June was at much lower rates. These data correspond to farmer experience—low rates of soil moisture depletion in the early and late parts of the season, very high rates of soil moisture depletion in midseason. In contrast to corn, grass and legume crops demand water at high rates from the beginning of the growing season and continue until hay harvest. Moisture consumed by deep - rooted meadow and pasture crops exceeds that by shallow-rooted crops by several inches—especially in July, August and September.

Normally, in the humid sections, there is enough precipitation along with soil-moisture storage to supply crop needs. Frequently, however, waste of rain water in runoff, or periods of deficient rainfall, result in partial or complete crop failures. The former—waste of rainwater—is within the means of the farmer to "do something about." Conservation of water by improved crop rotations, contour cultivation, and mulches is practical in many areas. Fewer moisture-deficient periods and fewer crop reductions are thus experienced.

Frequently, rainfall during the crop season is insufficient to supply the needs even though none is wasted in runoff. Many farmers are finding it practical to supply the needed water by irrigation. Within the past 11 years, the area of irrigated farmland in the humid regions of

the United States has increased from 300,000 acres to nearly 900,000 acres.

Before entering into such a program, it is wise to get some good advice on: the amount of water needed, the adequacy of its source, methods of application, and the like.

There is reason to believe that irrigation of farmland in the humid region is likely to continue increasing in years to come.

Lysimeter records at Coshocton revealed the magnitude of dew and its importance. Hot days and cool nights and low soil-moisture content are ideal for moisture condensation. This moisture has totaled from 6 to 10 inches in a year's time. More important, however, is this moisture during drought periods like that of August 1951 when rainfall totaled about 0.5 inch. Dew for the month of 1.4 inches along with the half inch of rain provided sufficient moisture to prevent serious wilting. Farmers, for a long time, have realized the value of dew—especially in dry periods.

Creep-Feeding Calves Add Extra Weight

Have you been out looking over your beef calves and wondering whether you should feed them grain in a creep?

Harry G. Russell, extension livestock specialist at the University of Illinois College of Agriculture, says that creep feeding will pay if you expect to continue the calves on full feed at weaning time and market them as baby beeves.

Russell points out that each 10 to 12 bushels of grain the calves eat while they are nursing will result in about 100 pounds more weight at weaning.

Equal parts of cracked corn and whole oats will make a good creep ration. You might improve it by adding 10 per cent of a high protein supplement.

On the other hand, if you plan to winter your calves on a growing ration and graze them the following season, there isn't much point in creep feeding them now, the specialist says. Calves that have not put on extra weight by eating a creep ration will catch up with creep-fed calves the following summer on pasture.

University of Illinois

There's No Mirage on Mirage Flats

Land that wouldn't grow feed for a grasshopper is becoming a garden spot. . .

Condensed from The Western Farm Life

Dick Biglin

THEY SAY a mirage is something "visionary and unattainable, like an optical phenomenon produced by the presence of a layer of hot air, across which the observer sees reflections, usually inverted and often distorted." That definition, no doubt, led to the name of Mirage Flats in Sheridan County of northwest Nebraska, for 10 years ago there was little there but hot air or wintry winds.

To imagine that Mirage Flats could someday be a virtual garden spot would, 10 years ago, have been considered a distorted and inverted picture. In fact, old-timers say the land wouldn't grow enough to feed out a grasshopper.

Today, the picture is no longer inverted or distorted, and the optical phenomenon of buildings and homes, green fields and cattle, farmers and ranchers, women and children, may be a phenomenon, but they are as real as rain. This amazing change for some 12,000 acres of Nebraska's prairie land has been anything but easy, as every resident of Mirage Flats will testify, but in another five years they may look to this area as the garden spot of Nebraska, an oasis in the sandhills.

Around the turn of the century, other Nebraska pioneers had the desire to create a garden spot on Mirage Flats. With backbreaking toil they built flumes of wood and dug an irrigation ditch, which is still visible today. The work of bringing water into the Flats halted abruptly when a prairie fire ruined the wooden flumes.

Mirage Flats was reborn into

Reprinted by permission from The Western Farm Life, Denver, Colorado

a productive area through the help of the federal government, which before World War II had its eye on developing this desolate prairie into a farming community. The government, through the bureau of reclamation, bought the land from six landowners. Then the bureau and the soil conservation service teamed up to develop the land. The greatest hindrance to development was the lack of water, so the bureau of reclamation put a harness on the rambunctious Niobrara River by building Box Butte dam, which now backs up Lake Felton, the source of irrigation water for the Flats.

As the main canal and laterals were constructed, the migration to Mirage Flats started. Eager young farmers and their families hurried to "homestead." Most of them hauled trailer houses on their land, selected the farmyard site and looked around at the fenceless, treeless, barnless, houseless expanse.

"At first it sounded so easy," one Mirage Flats housewife said. "I thought we would just drive in and start building," she declared, "but my, oh my!" The latter exclamation covers a multitude of heartaches and backaches, for it was a battle royal from the start to get water, heat and electricity. And the battle isn't over. There are such things as a school, decent roads, telephones and countless other "luxuries" that not long ago were absolute necessities.

In 1948 the first land was sold, although some land had been leased by prospective land owners before that. A limited water supply for irrigation was brought into the area about 1946, but it was 1949 before the big invasion by young farmers began. Many of them were war veterans, and most of them lived in their trailer houses for a year or two before they could build a home. The problem of making a living from this new land came first.

To get title to their land, the farmers had to file applications, stating their preferences in the choice of land and location. The applications were screened to leave only those who could prove they were adaptable to farming. Into a fishbowl went the names of the applicants and drawings were made to determine the order of selection. The Mirage Flats farmers are buying their land outright from the government on long-term payments.

The people of Mirage Flats are as solidly knit together as any early American settlement in a wilderness. The hundreds of common problems have weld-

ed them into a progressive community of 110 families.

The farm units range from 85 to 135 acres of irrigated land. Some have dryland pasture, in addition to their irrigated land. There is a wide variation in farming activity, from cash crops to strictly livestock. Grade A dairying, with some of the finest milking parlors and milk rooms in the state, is getting well established.

That Mirage Flats may well turn out to be a farming paradise is evidenced in the potato crop, which has averaged over 150 bushels above the average for irrigated land in western Nebraska. The rich soil also produces beans, tall corn, sugar beets that have produced as high as 25 tons to the acre, small grain, alfalfa and pasture.

The water allotment for each farm is based on the available water supply, with the average at about 1½ acre-feet for irrigation. With about 32 miles of main canal, every farm is bordered or crossed by the main ditch. Each farm has its own turnout and the laterals are made by the farmer with the help of equipment belonging to their Mirage Flats water district.

Typical of the battles that this community has had to wage in its fight for existence is the school redistricting legislation which roared on up to the supreme court before it was settled. Parts of five districts were incorporated to form district 30, and to provide a firm foundation for the education of their children, the residents of the Flats are going to build a $70,000 school building. This year they expect 75, and statisticians have estimated that at the peak there may be some 220 children attending school in Mirage Flats. The flatlanders have organized their school and raised funds for the building without aid. Most of the community's other ventures have been undertaken without state or federal aid.

Activity in the Flats sometimes bogs down in the spring, or during a winter thaw. This spring was no exception. Roads frequently resemble a hog wallow, with only two lonesome ruts showing and the ground between the ruts is neatly shaved off by cars and trucks. The average life of a passenger car in Mirage Flats is two years, if you are lucky, and even then you have to be your own mechanic. The Flats could well be a proving ground for cars. So, for obvious reasons, the people in Mirage Flats have a 3-mill levy working to buy road equipment and lower the mud

table on the roads. One new stretch of road connecting highways 87 and 19 will cut miles and bumps to a minimum.

To help keep the Flats organized, a community council, composed of representatives of various clubs in the area, meets regularly to iron out difficulties. Two churches, a Danish Lutheran non-denominational and a Catholic church, supply the spiritual foundation for the community.

One of the characteristics of a flatlander is his willingness to try anything along a farming line. Experimental test plots are run on the Flats for grain, sugar beets and potatoes.

Last year is the first year they have harvested every crop that was planted. As if starting a new community from the ground up isn't enough, several tantrums by Mother Nature have wiped out crops. In 1948, for example, five hailstorms raked the area like the blades of a feed grinder. Then in succession, aphids ate the small grain crops in 1949, rust snapped the bean harvest in 1950, and a blight hit the potatoes in 1951.

Families in Mirage Flats have an unbounded faith. As newly planted trees grow, new roads are put in, a telephone system is installed, the flatlanders know there isn't a mirage on the place.

Be Sure New Sows Are Free From Brucellosis

Looks and blood lines aren't everything when you're buying new gilts or sows to add to your swine herd. Freedom from brucellosis is important, too.

It's important to insist on brucellosis-free stock. Infected swine can spread the disease to healthy sows, causing them to abort, become sterile or have weak or dead pigs. Also, many cases of undulant fever in humans are caused by brucellosis infected swine.

Before buying new breeding stock, insist on seeing the herd's blood test record, veterinarians suggest. Check to be sure the herd has been proved healthy by at least one recent test.

If the herd has not been tested, try to get it done before you buy. Even if the animals are negative, it will still pay to quarantine them for 30 to 60 days and then retest before you add them to your herd.

Spread of brucellosis by infected boars can be a serious problem. In Illinois, a state law requires that boars be tested and found free of the disease before they or their services can be sold.

Ideas to Help You Grow Legume Seed

How one grower takes some of the gamble out of seed production. . .

Condensed from Capper's Farmer

Clyde Zimmerman

SEED yields of alfalfa and red clover vary tremendously, and a big reason is management. The more you leave to chance, the less chance you have to cash in on a good seed crop.

Not many Corn Belt farmers want to make legume seed a main enterprise every year as does Roy Eykamp, Kingsbury county, South Dakota. He reguarly cuts a seed crop from 250 to 500 acres of alfalfa and red clover. Some of his alfalfa fields have yielded 600 pounds of seed an acre. And red clover has returned up to five bushels an acre.

Eykamp has been developing in the seed business for five years and wants to keep most of the 720 acres he farms in alfalfa and red clover. His ideas on seed production pay off. Some of them may pay off for you—even if you cut clover and alfalfa for seed only once in a while.

He starts with a good variety. His alfalfa, a strain of Cossack, has been on his farm for many years. And he applies 250 pounds of 0-40-0 an acre in establishing alfalfa. He sometimes plants without a nurse crop, as often the latter is just competition for the legume.

Eykamp inoculates legume seed and treats it with Arasan. Last spring he sowed six pounds to the acre. "The stand of alfalfa and red clover was perfect," he said. "Seedlings were stronger and I used only half as much seed as I did before treating."

The rule book doesn't govern Eykamp all the way. It's common practice to cut the first crop for hay and take the second for seed. Eykamp ordinarily

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does the reverse. He says in his area you can't count on enough rain in the growing season for a bumper seed crop at second cutting. He doesn't like to cut hay on seed fields, but has clipped them when heavy June rains made growth rank.

Another Eykamp practice is to cut alfalfa at night. He starts at midnight, finishes at 8 in the morning. With dew on plants, less seed shatters.

At first, he pinned windrows down with laths. These were spaced a rod apart. Now he has a 55-gallon metal barrel on wheels, pulls it behind the tractor on windrows so they are compressed and don't blow or run. Some farmers use a metal plate under the tractor which presses the windrow down.

Eykamp has a "roll-up" windrower behind a 7-foot mower which deposits the legume with seed tending to be on the inside. He can't employ a 10- or 12-foot windrower because of big growth when he cuts. He ordinarily lets windrows lay two days, then threshes with three combines. Special sprockets let the pickup attachment travel at the same speed as the combine, so windrows aren't easily pulled apart.

Eykamp likes a combine with large capacity—at least a 12-foot machine. He sets cylinder speed at 4,500 to 5,000 feet a minute when threshing from windrows. This leaves straw in better condition—longer pieces and less chaff—so seed can be separated and cleaned with less loss over the rear of the combine. There's a husk around each red clover seed which floats like a parachute and is hard to separate. Eykamp finds a rubber cylinder is best for clover.

All combine adjustments are very important. Eykamp gets good results with a clearance between cylinder and concaves of 1/16-inch on red clover and 1/8-inch on alfalfa. He equips the shoe with one adjustable lip sieve and a round-hole screen. On the straw rack he uses a screen with 1/2-inch hole which relieves the load on the shoe by carrying over more straw. This equipment improves seed and chaff separation so the operator can travel faster. Also, less seed is broken or cracked.

Low yields convinced Eykamp of the need to import honeybees to aid pollination. For a time he handled his own colonies, now works with a commercial beeman.

Biggest advantage of having plenty of bees, Eykamp says, is that you can take the full advantage of good pollinating weather. Also, the quicker pol-

lination is accomplished, the more evenly seed pods ripen and the less opportunity for insect damage.

Lygus bugs are a threat to alfalfa every year, and some seasons grasshoppers and other insects must be dealt with. Lygus bugs feed on buds and blossoms and are best controlled when plants are in bud stage. Eykamp sweeps fields with a net, treats when he counts two or more insects per sweep. He hires fields sprayed by plane—DDT for lygus bugs, toxaphene and aldrin for hoppers. Spraying is done in evening and early morning.

Some seasons the weather just doesn't favor pollination with enough hot windy days so bees get the job done. That's why Eykamp showed interest last summer when Dale Hvistendahl, Nobles county, Minnesota, brought his "mechanical bee" into South Dakota for trial. The machine pollinates alfalfa mechanically.

This machine has a row of vertical rubber rollers which trip alfalfa blossoms to expose the pollen. An LP-gas unit heats air which is blown into a pollination chamber behind the rollers. The heated air "dusts" pollen and blows it around.

Eykamp helped improve the pull-type machine. Hvistendahl redesigned it to mount on the back of a tractor and cause less damage to plants. Eykamp got 600 pounds of seed an acre from 10 acres of alfalfa covered with the machine.

Eykamp thinks he can continue to make money by taking much of the gamble out of seed production.

Copper Sulphate Helps Control Foot Rot

A 10 to 30 percent solution of copper sulphate used as a foot bath was suggested by L. E. Boley, head of Illinois' department of veterinary clinical medicine, to help control foot rot in the dairy herd.

Four-fifths of a pound of copper sulphate in a gallon of water makes a 10 percent solution, according to Dr. Boley. A 30 percent solution needs 2½ pounds of copper sulphate in a gallon of water. You will find copper sulphate hard to dissolve in water. To make the job easier, use hot water and pour it over the powdered crystals.

University of Illinois

Roughage Quality and Milk Production

Here are results of extensive Cornell tests on barn dried and field dried hay and silage. . .

Condensed from Guernsey Breeders' Journal

George W. Trimberger

WHERE you find quality roughage you find increased milk production, healthier cattle, usually a longer productive life and more economical production. The most successful dairymen today have high quality roughage as the foundation to their program, regardless of whether they are interested in just profitable commercial milk production or trying to set new state and national records.

Realizing the practical importance of roughage to the farmer, especially in the Northeast where weather conditions are often adverse., Cornell University has carried on a continuous research program on improved hay and silage for a number of years.

These experiments have been wide in scope, emphasizing field production, storage losses, and feeding results. The article on roughage here presented will give the results in summary form of these extensive Cornell experiments, and will stress the practical application of this research.

Roughages Compared

To provide complete information, the yield, harvesting and storage losses, and the feeding value to high producing cows were obtained for mixed legume and timothy roughages when the forages were harvested by different methods. The comparisons made were for barn-dried hay, field-cured hay and hay crop silage when the forages were harvested at the same time (same stage of maturity) and when the harvesting for each

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method was at a different time, the way it might be handled on the farm. For the latter, part of the crop was cut early for silage, the barn-dried hay was harvested next, and eventually the remainder at a later date for field-cured hay and late-cut hay crop silage. The stage of maturity of the timothy is more important than cutting date, since maturity at the same date is variable even within a state. However, this information for a two-year period was as presented in Table 1.

During the remainder of this article when the terms early-cut hay crop silage, early-cut barn-dried hay, late-cut field-cured hay and late-cut hay crop silage are used it will refer to the above stages of maturity and cutting dates. Hay crop silage will be used interchangeably with grass silage, the terminology used in many localities.

Roughage Consumption and Milk Production

No appreciable differences in feeding value were found among barn-dried hay, field-cured hay and hay crop silage when the forages were harvested at the same time and therefore the same stage of maturity. These results are presented in Table 2. However, there were some differences in harvesting and storage losses as will be presented later.

When the hay crop for silage and for barn-dried hay was harvested at different dates (different stages of maturity), comparing favorably with the harvesting pattern followed on the farm, there were very significant differences in the milk production obtained. These results for the harvesting dates and stage of maturity are presented in Table 3.

The daily roughage consumption figures indicate that intake increases with quality of roughage which then permits a higher percentage of the nutrients to be obtained from roughage. Also, as will be shown later, the digestibility of the early-cut forage is much higher. The result is higher as well as more economical milk production. In considering these results it must be recognized that the differences demonstrated by these experiments are due chiefly to forages harvested at different stages of maturity rather than preservation by different methods. However, the methods used often afford the only means by which the hay crop can be handled early in the season, especially in the northern and northeastern states where the weather is extremely catchy early in the season when hay quality is high.

TABLE 1

Maturity and cutting date for roughages harvested by different methods

KIND OF ROUGHAGE	DESCRIPTION	Cutting Date 1950	1951
1. Early-cut silage	Timothy heads in boot	June 7	June 1
2. Barn-dried hay	Timothy headed, prebloom	June 15	June 18
3. Field-cured hay	Timothy full bloom	July 5	July 10
4. Late-cut silage	Timothy full bloom	July 5	July 10

Barn drying or ensiling the early hay crop often is the only way hay can be stored at the most desirable time without excessive and costly weather damage.

Dry Matter Yield at Different Stages

For proper evaluation of the various systems of forage harvesting and preservation, consideration must be given to total dry matter yield per acre as well as total pounds of milk produced from an acre of land. This is again dependent on the type of forage that can be successfully produced as well as seasonal, climatic and many other factors. Considering both the first and second cutting, the total dry matter yield per acre was low very early in the season, then reached a peak at about the stage of maturity and cutting date described above for the barn-cured hay after which there again was a decline as the season and maturity advanced. Although the majority of farmers do not have the facilities, or the time, available for dry matter determinations, their trained eye from years of experience can usually give them a fairly accurate indication of this information. More milk per acre was obtained from forage pre-

TABLE 4

Dry Matter Losses During Harvesting and Storage

Roughage	Field Losses*	Dry Matter Content When Stored	Storage Losses** Fermentation and Seepage	Top Spoilage
	%	%	%	%
Early-cut, hay-crop silage	0.7	18.4	17.9	2.3
Early-cut, barn-dried hay	8.5	61.0	7.6	----
Late-cut, field-cured hay	16.1	76.1	7.6	----
Late-cut, hay-crop silage	0.6	29.1	10.9	6.5

*Loss of cut material.
**Percentage based on amount stored.

TABLE 2

Daily consumption and milk production for roughages harvested at the same time (same stage of maturity) by different methods

Roughage	No. of Cows	ROUGHAGE CONSUMPTION Hay	Hay Crop Silage	Dry Matter Intake From Roughage	Daily Grain Intake	Daily 4% Fat-corrected Milk Production	Daily Gain or Loss in Weight
		lbs.	lbs.	lbs.	lbs.	lbs.	lbs.
Barn-dried hay	63	30.1	None	27.1	9.8	31.5	+0.3
Field-cured hay	63	30.5	None	27.4	9.8	31.1	−0.7
Barn-dried hay	27	28.3*	None	24.4	10.5	31.2	−0.1
Field-cured hay	27	27.4*	None	24.5	10.5	30.6	−0.5
Hay-crop silage	27	6.0*	53.4	23.1	10.5	31.9	−1.3

*Includes 6 pounds of second cutting mixed hay fed daily to all cows to supplement the silage and other hays.

served as barn-dried hay than from early silage, late silage or field-cured hay.

Harvesting and Storage Dry Matter Losses

In considering these results, the information would not be complete unless harvesting and storage losses were included. These are very important from the standpoint of the influence they have on the total amount of roughage available for feeding from an acre of land.

The harvesting and storage losses for a two-year average in these experiments are given in Table 4.

Probably few farmers are aware of these large field and fermentation losses which result during harvesting and storage. The losses as presented in Table 4 are for forage harvested without rain or only a sprinkle of rain. The losses increase rapidly when the cut hays are exposed to heavy rains.

The harvesting and storage

TABLE 3

Daily consumption and milk production for roughages harvested at different dates or stages of maturity by different methods

Roughage	No. of Cows	ROUGHAGE CONSUMPTION Hay	Hay Crop Silage	Dry Matter Intake From Roughage	Daily Grain Intake	Daily 4% Fat-corrected Milk Production	Daily Gain or Loss in Weight
		lbs.	lbs.	lbs.	lbs.	lbs.	lbs.
Early-cut, hay-crop silage	24	None	116	27.3	11.5	44.7	+0.4
Early-cut, barn-dried hay	24	30.5	None	26.1	11.5	40.0	+0.4
Late-cut, field-cured hay	24	24.4	None	24.4	11.5	37.6	+0.2
Late-cut, hay-crop silage	24	None	87	24.1	11.5	38.1	−0.5

losses are reflected in the amount of roughage finally available for feeding from that cut. The percentage of dry matter in the crop actually cut, which was available for feeding from a two-year average when the forage was harvested at the same time by the different methods, was as follows:

Barn-cured hay	85%
Hay-crop silage	79%
Field-cured hay	76%

The above results for the average dry matter retained for feeding agree very closely with results from the second or later experiment for cutting at different stages of maturity. Based on a two-year average these were as follows:

Early-cut, barn- dried hay	84.5%
Late-cut, hay-crop silage	82.1%
Early-cut, hay-crop silage	79.3%
Late-cut, field-cured hay	77.5%

The differences observed in the fermentation and seepage losses between early- and late-cut silage led to the experiment in progress at present on silage preservatives and total fermentation and run-off losses for early-cut hay-crop silage.

Digestibility of Dry Matter

The digestibility of the roughages has an influence on the nutrients available for milk production and weight gains and finally on the digestible dry matter yield per acre. For forage cut at different stages of maturity, great differences in digestibility of the roughage fed were obtained.

The per cent dry matter digestible at the different stages of cutting listed in Table 1 approached the 70 per cent level for early-cut silage, the 60 per cent level for barn-dried hay and just about 50 per cent for the field-cured hay. With a good grain mixture, usually containing about 75 per cent digestible nutrients, it is immediately evident why early-cut roughages properly stored will replace some of the high priced grain in the ration. In many localities, the early harvesting of forage requires barn drying or preservation as silage to eliminate some of the weather hazard early in the season. These methods of preservation also decrease the field losses which result in a greater retention of the leaves which have the greatest feeding value. This will also have some effect on digestibility, as the higher the leaf content the higher the digestibility at the same stage of maturity.

Carotene Content

The carotene content in roughages is considered important to the health and well-being of the cow, and also to the quality of product produced. Regardless of the method of harvesting, carotene losses during harvesting and storing were large, but storing roughages in the form of silage is much more effective in preserving the carotene in the feed.

Results from one year when complete carotene studies were made can be considered typical, and these are in close agreement with results from other experiments. The carotene content in micrograms .per gram of dry matter when fed were 140 for early-cut silage, 20 for barn-dried hay, 10 for field-cured hay and 84 for late-cut silage.

Although any of these roughages had enough carotene in the feed to meet the requirements of the cow and produce a respectable quality of milk, the higher carotene content of the early-cut, hay-crop silage was reflected in a highly significant increase in carotene and vitamin A content of the blood plasma, and also in the milk produced from these cows. For some cows on continuous feeding throughout the winter, the differences in carotene and vitamin A in the blood plasma and milk were five times greater for the carotene and two times greater for the vitamin A in the blood plasma on hay crop silage as compared to field-cured hay. The milk contained 3½ times as much carotene and two times more vitamin A for cows on these two rations. This, however, has no practical importance except where it is desirable to produce a special product, because the ordinary ration meets the minimum carotene requirements.

Use in Practice

Many dairymen throughout the United States are giving splendid demonstrations on the use of improved roughages on their farms. Two outstanding examples are Greystone Farms owned by Lloyd Riford and Tom Staples, at Auburn, N. Y., and McDonald Farms near Cortland, N. Y.

At Greystone Farms the owners are interested in the manufacture of high quality grain feeds. However, they appreciate the importance of quality roughage to go with good grain. They have produced some very high quality roughage for their deep-bodied, large and high producing cows.

At McDonald Farms, the practice has prevailed for years to

depend on good roughage and to limit grain consumption to a very practical level. Many people have recognized the outstanding udders in this herd and how their cattle have had a long productive life with probably less mastitis than any herd of similar size in the United States. When large barn drying equipment was installed at McDonald Farms a few years ago, the high potential of excellent roughage was demonstrated by increased production.

A considerable number of farmers are interested in one of the most economical patterns of roughage production where a forage harvester is used to cut hay-crop silage, field chop the hay for barn drying and later in the season field chop the corn silage. The successful use of cut hay is dependent on cutting it long and on the availability of a barn drier to eliminate the requirement that the hay be very dry to avoid barn heating. Using the barn drier for field-chopped hay permits storing before the hay becomes too dry which results in heavy field losses, especially leaves which are high in feeding value.

When these changes are made toward improved roughage production, a common experience is that more roughage will be consumed and sometimes additional roughage has to be purchased. The palatability is so favorable that the daily consumption is increased. This saves grain, requires more roughage and results in more economical milk production.

Summary

1. Very early harvesting decreases the yield of first cutting but produces a higher yield from the second cutting. The total yield of digestible dry matter for the season is best when the first cutting is harvested at the intermediate stage when both yield and quality are fairly high.

2. Early cutting for silage or barn drying reduces the field losses. Uncut material due to lodging is high later in the season. Fermentation and seepage losses are higher for early cut forage, but the total losses are usually less with the early cutting, provided severe weather damage can be avoided.

3. Barn drying hay reduces considerably the curing time in the field, but takes advantage of reducing the moisture content and thus the handling of water, and at the same time cuts down on harvesting and storage losses. This results in the greatest saving of nutrients from those available for harvesting.

4. Ensiling the early hay crop

has the advantage that it can be used any time almost entirely independent of the weather. It does, however, require more work and thus is more expensive for harvesting.

5. Rainy weather, which occurs so frequently early in the season, does not materially increase dry matter losses for silage, but may result in heavy losses for barn drying and especially for field curing.

6. The palatability of the early-cut forage is so favorable that the total dry matter intake daily is considerably higher for the early harvested forage.

7. Digestibility for the early-cut forage is extremely high and decreases rapidly as the forage matures. This range can extend from 70 per cent for digestibility of the very early-cut forage down to 50 per cent or less for late-cut roughage.

8. The excellent combination of high palatability and digestibility permits the cow to consume a larger amount of digestible dry matter from early-cut forage. This results in higher milk production and saves grain.

9. The earlier the forage is cut the higher the daily milk production. Usually this is accompanied by more favorable body weight gains. The differences between the two silages clearly demonstrates how much the resulting silage is dependent on the quality of the forage ensiled.

10. Hay crop silage and barn drying both permit early cutting and provide methods for beating bad weather. Silage involves less risk from the weather but usually has higher storage losses. Cost of harvesting should be considered for each individual farm situation.

11. Since yield of forage, palatability, digestibility, resulting milk production and body weight gains all decrease rapidly from forage harvested late in the season, the optimum period for harvesting usually does not extend much beyond a period of three weeks. This should be recognized in considering methods of harvesting and results obtained from the practical application of each method.

12. The experimental results available from feeding tests suggest the desirability of recommending more extensive use of barn hay-driers and storage of silage to harvest the hay crop during the most favorable time for high feeding value, optimum milk production and highest yield of digestible nutrients and milk per acre.

THIS ARTICLE in three parts is the first ever serialized in FARMERS DIGEST. If you like it, we can bring you other important reports too long for a single issue. We believe it marks another step toward our aim to bring you all that's good in agriculture information.

JUDGING LAND

Condensed from Judging Land for Soil Conservation

HAROLD E. GROGGER and
ALBERT B. FOSTER
Soil Conservation Service

The newest of judging activities is a fascinating study for every man and boy interested in agriculture. This comprehensive article in three parts will tell you how to do it on your own land. It will give you step-by-step procedure from principles to score card.

MORE people are interested in soil conservation now than ever before. Land can be destroyed. If not properly cared for it gets poorer and poorer until it can no longer produce the food and fiber the country needs. If properly cared for it means better living for the farmer.

Conservation work on farms during the last 10 to 15 years has convinced farmers, research workers and soil conservation specialists that an *understanding of the land itself* is needed before a soil conservation program can be planned.

This need for an understanding is recognized by the Soil Conservation Service, and by thousands of farmers who have cooperated in planning conservation programs on their farms. The question of what land information is needed to make a sound soil conservation plan for a farm arose early in the conservation movement.

Gradually the answers are being found. Six major physical

land features constitute the primary basis for the type of land capability inventory the Soil Conservation Service uses in its work at the present time with soil conservation districts and cooperating farmers. These six major features are not all-inclusive but if they are understood by farmers—the people who are actually going to conserve our soil—there is good reason to believe the conservation job will be done well.

If this is true, then it seems reasonable to recommend also that these land features be used as the basis for land judging by farmers who will be or are in charge of the land.

Knowledge of the following six features will help provide a better understanding of the land:

Color of surface soil.

Depth of the soil material favorable for the feeding zone of plant roots.

Air and water movement.

Texture of the surface soil.

Slope of the land.

Depth of the surface soil (extent of erosion).

A discussion of each follows:

Color of Surface Soil

A dark surface color indicates that over the past years much living matter has grown on the land and has been returned to the soil in the form of organic matter. Such soils originally had good surface tilth and an adequate supply of organic matter and plant nutrients.

The color of the surface soil is one of the clues left by Nature that helps us determine the inherent fertility of the soil. A field may have been abused by past misuse and as a result the present fertility may not be equal to the inherent or native fertility. But the color of the surface will give a good indication of how a soil produced in the past and an indication of needed treatment to assure future production.

In judging soil color these three categories are suggested:

Dark—This includes the black and dark brown colored surface soils which usually indicate a relatively high inherent fertility.

Moderately Dark—This includes the dark gray, grayish brown and the light brown surface soils indicating a moderate inherent fertility level.

Light — This includes the brownish-gray, gray, or light gray surface soils and indicates a low or very low inherent fertility level.

Surface soil color can be determined merely by looking at a

handful of the soil when it is moist.

We cannot determine the present level of plant nutrients by merely looking at or feeling the soil. After judging the land's inherent fertility by noting the color, soil tests will help in planning a conservation program by indicating what kind and how much fertilizer to apply.

Depth of Soil Material

Depth of soil material refers to the combined depth of surface soil and subsoil where the plant roots can live and do well in their job of getting food and water for the plant.

Under the climatic conditions of the Upper Mississippi River Region of the United States 36 to 40 inches of soil material, of favorable texture and structure, has been found to provide sufficient food and water storage capacity for the growth of adapted crops. Soils of lesser depth will usually be lacking in food and water storage capacities.

Presence of any layer in the soil which severely restricts or prevents thrifty root development and growth at less than 36 inches will limit the effective depth of a soil. Common restrictive layers are rock layers; dense chert layers; sand or gravel layers; hardpan, claypan, or siltpan layers.

Three classes of soil depth are suggested:

Deep—If the combined thickness of the favorable surface soil and subsoil is 36 inches or greater in depth.

Moderately Deep—If the presence of a limiting or restrictive layer occurs within 20 to 36 inches of the top of the soil.

Shallow—If the presence of a limiting or restrictive layer occurs at 20 inches or less in the soil.

Soil depth can be judged by digging in the soil with a soil auger or spade or by observing road cuts or gully banks to determine the presence of any limiting layers. Soil depth determines the area which is fav-

orable for the storage of plant food or water. For example, research investigations have indicated that a 12-inch layer of favorable soil material such as a silt loam or loam will hold about 2 inches of water. Additional studies indicate that a normal crop, such as corn large enough to shade the ground, in July and August will require about an inch of water per week. A loam soil only 18 inches deep would hold about 3 inches of water. This would, under average conditions, furnish moisture for the plant for only a 3-week period. If sufficient rain did not fall and enter the soil in this time the plant would shrivel and fail to grow.

Soil depth also is important in seedbed preparation, construction of terraces and ponds, and affects the kind of crops that can be grown.

Air and Water Movement in the Soil

A soil, to have favorable air and water relationships must be able to take up water readily during periods of rain and dry out or warm up readily when the rain is over. It must hold ample moisture to supply the needs of the crop between rains and yet permit water to pass through the soil and prevent water logging and excess moisture. A soil with favorable air and water relationship, with a reasonable amount and distribution of rain, will not stay too wet nor become too dry.

This relationship or exchange of air and water in the soil is known as the air and water movement. It has great effect on the kind of crops that can be grown, how soon the soil can be worked, benefits that can be expected from fertilizers and the delivery of food and water to the plant by the plant roots during periods of wetness and dryness.

The air and water behavior in soils is influenced by many things, some of which are the texture and structure of the soil, the degree of density or porosity of the soil, and the thickness of the various layers.

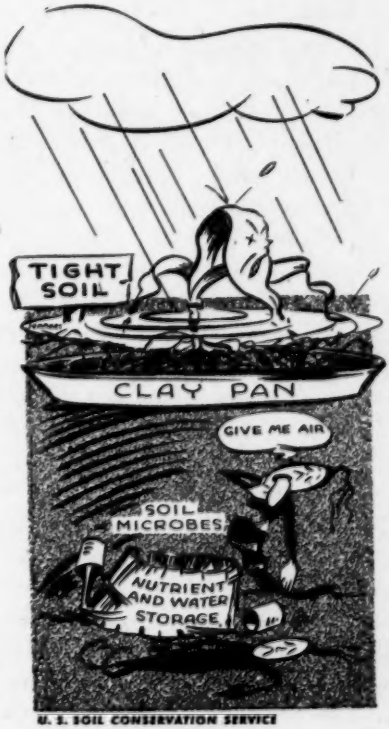
One of the best clues, however, to soil, air and water relationship is the *color of the subsoil.* Just as a plow share will oxidize or rust when exposed to intermittent wetting and drying so will a soil oxidize under favorable air and water movements. A soil having a moderate air and water behavior has good aeration yet ample moisture for favorable chemical reaction. A well oxidized soil has bright colors of

red, yellow or brown in the subsoil. A soil with too much water and not enough air will not oxidize well and the colors will be dull or gray and frequently mixed or mottled colors of gray, black, yellow and brown will occur.

For general purposes of judging land, all soils can be grouped into one of the following air and water behavior conditions:

Rapid (which may be subdivided into moderately rapid, rapid, or very rapid in some areas)—This means that water and air movement is slightly faster than is desirable. Water moves through the soil too fast and the soil does not hold enough moisture for the most favorable soil functions. Air will replace the water and the soil will be droughty. These soils normally will allow at least 2.5 inches of water to pass through them in one hour. Oxidation will have been very thorough under this condition and subsoil colors will be bright even though air and water movement is too rapid for best soil functioning.

Moderate—This is the most favorable condition of air and water behavior—just right for normal soil functions. The soil allows an exchange and movement of air and water which is neither too great nor too little. This permits adequate passage of water for quick warming-up of the soil, yet the soil retains enough moisture to withstand reasonable periods with no rain. Moderate water movement is considered to be between .8 and 2.5 inches per hour. This soil has a well oxidized subsoil as indicated by a bright



color such as red, yellow, or brown throughout the subsoil.

Moderately Slow – Water moves through the soil just a little slower than is desirable for best results. The soil holds enough moisture normally for most soil functions but is inclined to be slightly wet and cold natured in the damp spring seasons or following periods of heavy rainfall. Moderately slow water movement is measured between .2 and .8 inches per hour.

The subsoil in this case is less well oxidized and the colors will be bright in the upper part with dull gray or mixed colors usually accompanied by heavier texture in the lower subsoil.

Slow—In this case water and air move through the soil at a slow rate and the soil remains quite wet following the rainy periods and dries out rather slowly. Timely seasonable operations are often delayed and the most favorable plant growth may be delayed because of the wetness and cold nature of the soil. Slow water movement is between .05 and .2 inches per hour.

This condition is characterized by dull gray or mixed and mottled dull colors throughout all the subsoil.

Very Slow—In this case the water movement is so very slow that sufficient air cannot get into the soil and it remains wet and water-logged for rather lengthy periods. Such soils are not well adapted to some crops and normally remain wet in the wet seasons. They store insufficient available moisture for the plant and are droughty in dry periods. Water movement in these soils generally is less than .05 inches per hour.

Soils of this kind have gray color in the lower part of the surface soil—often called a gray layer—and the subsoil is dull gray, mottled and usually very heavy.

It is well to keep in mind that poor oxidation and gray colors reflect the natural air and water condition in a soil before any drainage may have been done. If such soils can be drained the air and water movement will be improved quickly but subsoil colors change very slowly. Therefore, the determination of air and water behavior in soils that have been drained can be judged more accurately by a careful study of subsoil structure and texture rather than by color. *(Continued next month.)*

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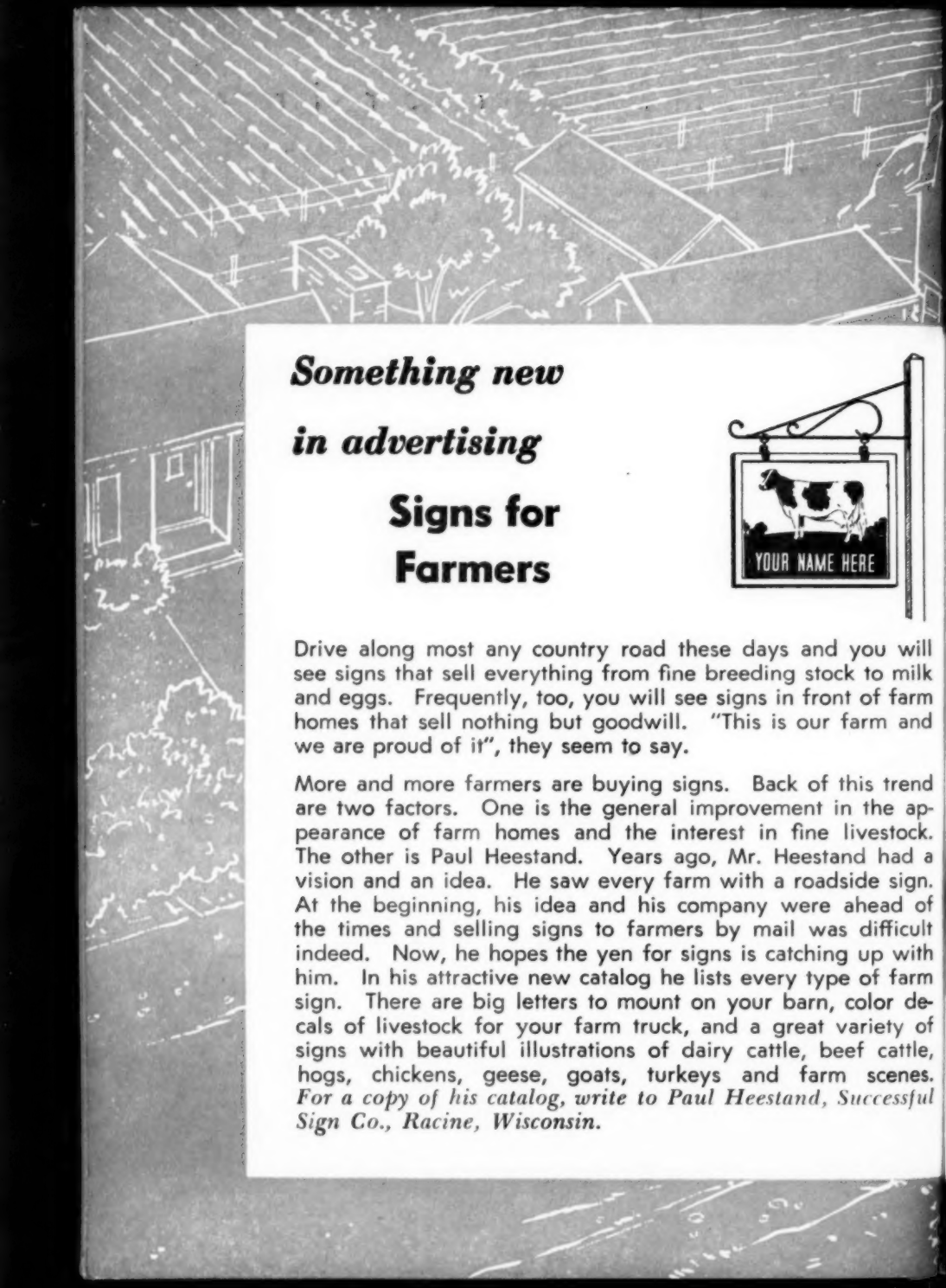

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